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TROPICAL DISEASES BULLETIN.

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TROPICAL OPHTHALMOLOGY.

A Review of Recent Articles. XXIX*

Pterygium.—Schroeder[1] has suggested that hypermetropia may be a potent factor in the causation of pterygium, though he acknowledges that dust and wind may be contributing causes. Hypermetropia leads to increased activity of the ciliary muscle and thus induces a hyperaemia of the anterior segment of the globe. "Irritation from wind or dust in the palpebral fissure is naturally greater in a more vascularized and warmer structure." A pinguecula results if the irritation is moderate and a pterygium if it is pronounced. The author has successfully treated pterygia by medical means only, but now usually performs a McReynold's transplantation.

Trachoma.—Foley and Parrot[2] have described the micro-organisms which they observed in cases of early trachoma. These are very minute, sharply defined, round bodies having a diameter of about 0·2μ, and lie in the cytoplasm of the epithelial cells. A scraping from the outer portion of the superior fornix near the trachomatous area is thinly spread on a slide, fixed in iodized alcohol and stained with a mixture of May-Grünwald and Giemsa. The authors consider that these organisms are Rickettsia and quite distinct from those described by Cuénod which they regard as cytoplasmic condensations; the organisms are, however, allied to the "elementary bodies" of Prowazek and Halberstaeder. They suggest the name *Rickettsia trachomatis* Halberstaeder and von Prowazek, 1907.

The *Revue Internationale du Trachome* for July 1937[3] contains an account of a discussion on a paper by Jean Sédan. M. Marquex remarked that the severity of the corneal lesions may sometimes bear but little relation to the development of trachomatous granulations in the palpebral conjunctiva and suggested that pannus and ulceration

* For the 28th of this series, see Vol. 34, pp. 899–902.

[1] Schroeder (Hans). Notes on Etiology and Treatment of the Pterygium.—*Malayan Med. Jl.* 1937. Oct. Vol. 12. No. 4. pp. 124–125.

[2] Foley (H.) & Parrot (L.). Rickettsia du trachome.—*Arch. Inst. Pasteur d'Algérie.* 1937. Sept. Vol. 15. No. 3. pp. 339–351. With 3 plates (1 coloured). [15 refs.]

[3] Revue Internationale du Trachome. 1937, July. Vol. 14. No. 3. pp. 162–173.—Sur la contagion du trachome envisagée du point de vue clinique (Rapporteur Jean Sédan. Discussion.)

were likely to be most marked when the upper lid of the patient pressed heavily on the cornea owing to a prominent globe or a narrow palpebral aperture. The downward extension of pannus as ptosis increases is suggestive. M. VANCEA voiced an impression that cases of unilateral trachoma might be due to some cause simulating the disease. Regarding the influence of flies as a source of infection Paul J. PETIT drew attention to the comparative immunity of Europeans living in a fly-stricken trachomatous country. He considered that mild trauma such as that derived from cactus fruit bristles or the application of Kohl might aid contagion. In discussing the paper by CUÉNOD and NATAF most speakers agreed that the louse was a possible vector. BAILLIART remarked that louse infection must occur in a different manner from typhus in which the organism is present in the blood; possibly contamination from the skin surface took place during the act of biting. Proof that trachoma was endemic where the population was lousy and absent where the reverse obtained would be suggestive. TRAPESONTZEWA stated that in Russia typhus and trachoma had no endemic relation.

Keratomalacia.—AYUYAO[4] has found the syndrome night-blindness, xerosis of the conjunctiva and keratomalacia to be fairly common in the Philippines. Cases of the disease constitute about one per cent. of hospital admissions to out-patient and in-patient clinics, and 2·23 per cent. of the blindness in the country is caused by it. Of 301 patients 98 were in the stage of keratomalacia. The keratomalacia met with in the Philippines appears to differ slightly in type from that with which the reviewer was familiar in India, as photophobia and blepharospasm with much pain are stated to have been always present. In India these symptoms were often remarkably slight when compared with the severity of the local lesion. The author regards the respiratory and gastro-intestinal diseases, so often associated, as being due to a vitamin A deficiency. Foods containing vitamin C and extracts of vitamin B were found useful adjuvants to codliver oil in the general treatment of the condition. He does not mention the local treatment he employed, but it may be stated that the use of any application which is in the least irritating (*e.g.*, nitrate of silver) may be most injurious.

Cataract.—STALLARD[5] has given a useful summary of some of the points in the modern technique of extraction. He uses one per cent. pantocain with adrenalin as an anaesthetic and adopts the usual blocking of the facial nerve, ruptures the anterior capsular layer with forceps and employs irrigation to free the chamber from lens remnants. The author advocates corneo-scleral suturing to ensure efficient closure of the wound (in tropical practice a " bridge-flap " is probably preferable). He adds the valuable conclusion that " after rendering the operation as safe as possible for the patient by preventing all hazards likely to arise during it there should be the minimum instrumentation of the eye necessary to effect the desired result."

Glaucoma.—The need for a proper consideration of the general constitutional causes of primary glaucoma has been stressed by FARID

[4] AYUYAO (Conrado D.). Clinical Observations on Xerophthalmia.—*Jl. Philippine Islands Med. Assoc.* 1937. July. Vol. 17. No. 7. pp. 399-402.

[5] STALLARD (H. B.). Some Points in the Modern Technique of Cataract Extraction.—*Post Graduate Med. Jl.* 1938. Feb. Vol. 14. No. 148. pp. 49–55. With 3 figs.

MASSOUD[6]. He quotes various observers who have noted a disturbance of sympathetic control in the disease following a derangement of the vegetative system. Faulty metabolism may originate special toxins that affect the uvea and lead to rises in intraocular pressure. The author has observed a relative increase in the number of large mononuclear leucocytes in the blood of glaucomatous patients, and this increase appears to be unaffected by any operative relief of the intraocular pressure but to be dependent on a general pathological process.

Sympathetic Ophthalmitis.—WALDMANN[7] has propounded an interesting theory regarding the origin of sympathetic ophthalmitis. He suggests that the infection is ectogenic and has a nasal origin; he quotes in support the statistics from a number of hospitals which show that the vast majority of cases occur during the winter months when influenzal and catarrhal troubles are prevalent, and claims that his theory would explain the well-known fact that the disease is uncommon in the tropics. A case of his own showed a rapid and permanent improvement after good drainage of the nasal sinuses and passages had been established. The implication of the optic nerve before the onset of the uveitis suggests, too, that the infection may spread from a sinus.

Leprosy.—PINKERTON[8] reckons that 80 per cent. of all leprous patients and 90 per cent. of all nodular leprous patients develop ocular complications. Tarsorrhaphy is often needed and the author now splits the outer portion of the lower lid and excises triangular portions of the skin and tarsus as in an operation for ectropion. When epiphora is troublesome the accessory lachrymal gland is first partially excised. Electro-coagulation has been found the best treatment for leprous nodules in the episcleral tissue. An iridectomy, if necessary, should be wide in order to minimize risk of closure by fresh exudation. Cocaine anaesthesia is often ineffective and novocaine infiltration is preferable.

The prevention of blindness in tropical countries was discussed by MACCALLAN[9] in a paper read at the XVth International Congress of Ophthalmology at Cairo. With regard to Egypt approximately 80 per cent. of blindness in 1933 was due to conjunctival disease. In temperate climates blindness varies per 100,000 of the population from 55 in Holland to 119 in England (in the latter country industrial accidents to the eyes are common); whereas in tropical countries the rate varies from 570 in India to 843 in Palestine; Cyprus and Egypt occupy intermediate places. Ophthalmia neonatorum is rare in Egypt, but children soon become affected by other forms of conjunctival disease. Trachoma is, of course, prevalent. The author suggests that this disease first started in Mongolia and spread westward with Mongol invasions and eastward through Siberia and China to the

[6] FARID MASSOUD. Extra-Ocular Influence in Glaucoma (Constitutional Factors).—*Brit. Jl. Ophthalm.* 1937. Oct. Vol. 21. No. 10. pp. 559–564. [28 refs.]

[7] WALDMANN (Béla). The Rhinogenic Origin of Sympathetic Ophthalmia.—*Amer. Jl. Ophthalm.* 1937. June. Vol. 20. No. 6. pp. 618–625. [23 refs.]

[8] PINKERTON (Forrest J.). Surgery of the Leprous Eye.—*Amer. Jl. Ophthalm.* 1937. July. Vol. 20. No. 7. pp. 715–720. With 2 figs.

[9] MACCALLAN (A. F.). National Policy to be adopted in a Tropical Country for the Prevention of Blindness.—*Brit. Jl. Ophthalm.* 1938. Feb. Vol. 22. No. 2. pp. 65–78.

American Indians by migration. Smallpox is a frequent cause of blindness in insufficiently vaccinated communities. Prevention embraces medical, sanitary and social measures. The ample provision of medical aid with school inspection, and an increase in sanitary education constitute the most hopeful measures of prevention.

A review of the ocular troubles connected with tropical diseases has been made by Thornwall DAVIS[10]. He pleads that the subject is important not only to practitioners in the tropics but also to those who work in temperate climates since, owing to greater travelling facilities, tropical diseases may now be encountered in temperate climates.

BUXTON[11] has given an interesting account of the striking work done by Sir Henry HOLLAND at Shikarpur. The institution is active for eight weeks in the year and an extraordinary amount of work is carried out during that short time, from 6,000 to 8,000 patients being dealt with. Glaucoma accounts for about ten per cent. of the total eye diseases; this is mostly of the chronic type and acute congestive glaucoma is a rarity. It is stated that "corneal ulcers are usually treated with an application of silver nitrate grs. LX to oz. 1 to the whole eye followed by irrigation." Such treatment would seem rather drastic to some surgeons. Holland prefers the intracapsular method of cataract extraction and adopts a modified Smith technique. A peripheral iridectomy is usually performed before lens delivery. A five per cent. rate of iris prolapse seems rather high. Possibly a lower rate might be attained if the iridectomy was performed subsequent to delivery.

The *Bulletin of the Ophthalmological Society of Egypt* for the year 1937[12] records the proceedings of the Society in its thirty-fourth session. A symposium on glaucoma was the principal feature of the meeting. The incidence, the early diagnosis and the treatment of the disease in Egypt were fully discussed. Dr. EISA HAMDY EL MAZINY BEY reviewed the statistics of primary glaucoma in the Egyptian ophthalmic hospitals during the period 1916 to 1935. The incidence during the four years 1917–1921 varied from 1·77 to 3·25. From 1921 to 1935 there was a steady continuous fall except for a slight temporary rise in 1930. He suggested that the greater facilities for the treatment of eye disease in the country have led to a marked increase in the number of those seeking advice on account of more trivial troubles and that the proportion of glaucoma patients has been reduced in consequence. Dr. R. P. WILSON stated that on making an ophthalmic survey of the village of Bahtim in the year 1929 he found the incidence of primary glaucoma to be 0·70 per cent. and secondary glaucoma to be 1·37 per cent. This is higher than in most countries and he remarked that he is convinced that trachoma is, to a certain extent, responsible. The general causes of the disease were reviewed by Dr. FARID MASSOUD, and the treatment was discussed by many members. Dr. IBRAHIM AHMED MOHAMMED read a useful paper on the pathology of the Meibomian glands in which he indicated their liability to be affected by general seborrhoeic conditions and their

[10] DAVIS (William Thornwall). Ophthalmology in the Tropics.—*Puerto Rico Jl. Public Health & Trop. Med.* 1936. June. Vol. 11. No. 4. pp. 736–750. [Spanish version pp. 751–767.]

[11] BUXTON (Robert). The Eye Hospital at Shikarpur, India.—*Brit. Jl. Ophthalm.* 1937. Nov. Vol. 21. No. 11. pp. 605–612.

[12] BULLETIN OF THE OPHTHALMOLOGICAL SOCIETY OF EGYPT. 1937. Vol. 30. Session 34. pp. xxx + 272. With numerous illustrations.

rôle in the causation and maintenance of conjunctival and corneal diseases. Particulars of many interesting cases are recorded in the number.

The Twenty-third Annual Report of the Ophthalmic Hospitals Section of the Egyptian Government for the year 1935 testifies to continued progress. New patients numbered 1,034,986, an increase of eleven per cent. compared with the previous year. 82 per cent. of existing blindness is said to be caused by the acute ophthalmias, and the gonococcus is stated to be the predominant infective agent. Ninety-nine per cent. of the pupils in primary government schools were found to be trachomatous—a truly appalling incidence. The report provides valuable statistics regarding the various eye diseases met with in the country. A chart illustrates most strikingly the intimate relation between the climatic seasonal rise in temperature and the number of patients treated.

The Twenty-fourth Annual Report for the year 1936 covers the same ground and includes pictures of the many fine ophthalmic institutions which have been provided during the past thirty-two years. The figures given in the previous report are confirmed and it is stated that ninety-nine per cent. of 10,757 school-children examined were trachomatous, about forty-two per cent. having the disease in a serious form.

The Eleventh Annual Report of the Memorial Ophthalmic Laboratory at Giza well maintains the high standard of its predecessors. In commenting on the investigations carried out by members of the staff, the Director, Dr. Rowland P. Wilson, remarks that heat and flies are the most vital factors in the causation of epidemic conjunctivitis in Egypt; direct contagion by hand, clothing and washing utensils is a subsidiary factor. Observations on children in villages show that conjunctival infection by pathogenic organisms (Koch-Weeks and gonococcus) occurs during the first three months of life; trachoma soon follows and, at its onset, "inclusion bodies" can be found in every case of the disease. These are often present before clinical evidence of trachoma is demonstrable. An appendix records some observations by Dr. F. Maxwell Lyons on Spring Catarrh and the relation of calcium deficiency to the disease; he concludes that such deficiency is not an essential factor in spring catarrh, but that it may increase the sensitivity of the patient and influence the course of the disease. The "solution to the problem lies in the abnormal hypersensitivity of the patients rather than in elusive 'activating factors'." *H. Kirkpatrick.*

MALARIA.

Malaria Survey of India. Kasauli. **Scope and Syllabus of the Annual Malaria Class for Medical Officers** [Covell (G.), Director]. —14 pp. 1937. Delhi: I.M.H. Press.

This course of malaria instruction lasts six weeks and comprises 40 lectures and 120 hours of practical work in the laboratory and in the field. The number of students is limited to 20 medical officers. The syllabus is comprehensive and complete. The course is held at Karnal in the Punjab. During the course each student carries out a malaria survey of one or more villages. *Norman White.*

Vickers (W. J.) & Strahan (J. H.). **A Health Survey of the State of Kedah with Special Reference to Rice Field Malaria, Nutrition and Water Supply, 1935–1936.**—pp. v + 96. With 4 maps, 36 figs. on 16 plates & 12 charts. [**Part II. Studies in "Rice Field Malaria" in Kedah,** pp. 10–29. [22 refs.] **Part III. A. Malaria in General,** pp. 30–50.]

The Malay State of Kedah is on the west coast of the Malay Peninsula and has a common frontier with Siam. It has a population of 464,000, mostly rural. Alor Star, the capital, has a population of 25,000 and Sungei Patani, the next largest town, 10,000. Alor Star is situated in the middle of rice cultivation which comes into the residential area, right up to the central congested slum. The country is flat, there are considerable swamps and the subsoil water is rarely more than two feet below the surface. Though ten miles from the sea, swamps and rivers are tidal, the water often becoming brackish. Anophelines are abundant. In spite of these conditions there is very little malaria (spleen rate 1·9, parasite rate 2·3). Sporadic cases, mostly *vivax* infections occur. Nearly the whole of North Kedah is similarly almost malaria-free.

Of the numerous anophelines found *A. barbirostris* was the only one found infected; it is probably the chief vector. *A. hyrcanus Pallas* may also be of importance. The breeding places of both these species are very extensive. Neither *A. maculatus* nor *A. umbrosus* are found in the Alor Star area.

Sungei Patani in Central Kedah is in close proximity to foot-hill rice fields which are extensive; there are also numerous seepage areas. The town is subject to invasion by *A. maculatus, A. hyrcanus Pallas* and *A. barbirostris,* yet no malaria appears to have been contracted there for a considerable period of time.

As a contrast to these conditions rice cultivation in ravines in hilly areas is sometimes associated with hyper-endemic malaria; *A. maculatus* breeding in seepage water is responsible. As the ravines get broader and flatter malaria is less in evidence.

Part II of the report gives information about malaria prevalence in Kedah as a whole; there are areas of high endemicity, and even hyperendemicity, in the centre and south of the State. Here the disease has a rainfall periodicity, mid and end year, unlike the autumn periodicity of the rice growing areas. *A. maculatus* is the most important vector: *A. umbrosus* is less common than in other parts of Malaya and *A. sundaicus* is of little importance as a vector on this part of the coast. In Central Kedah *falciparum* infections predominate.

The rubber estate populations are well looked after but 60 per cent. of the total population are out of reach of existing medical organization.

N. W.

Rosier (H. J.). Woningverbetering en malaria. [**House Improvement and Malaria.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1937. Vol. 26. No. 4. pp. 343–363. With 5 sketch maps & 9 charts. English summary.

Improvement and reconstruction of houses in native villages has now been a consistent antiplague policy for a number of years in Java. Special importance is attached to the measure, because it is regarded as permanent in contrast to any measures of anti-plague inoculation. It is somewhat disturbing to find set out in this article a measured and moderate opinion that such house improvement may not be without danger from the side of malaria. Briefly put, it is the old story of engineering works, an immigrant population, an endemic area, borrow-pits and rubbish residue.

The malarial outbreaks made their appearance just after the work of house improvement had been finished. Absolute proof of malaria, it is admitted, is difficult to establish but figure data are presented in the attempt to make the argument a reasonable one. Many controls lie to hand in the shape of districts in which housing operations have not been carried out. It is significant that 44 out of 71 " improved " subdistricts showed outbreaks, a proportion which could hardly be due to chance. Much of the proof for the malarial character of the outbreaks comes from a study of figures of mortality. It was contended that after the figures for plague had been taken into account and attention paid to dysentery, avitaminosis and influenza the remaining figures, as a whole, represented malarial deaths. Graphs are presented of residual mortality along with plague mortality and exact indication given of the times of house improvement operations on the chart. The main point of the whole argument is that in the Residencies of Batang and Pekalongan, where sub-districts were successively " improved," the outbreaks of mortality followed, during the years 1925 to 1931, the same succession and occurred in each case towards the end of the operations. As a subsidiary but very important part of the argument, is the reference to the subdistrict of Petoengkriono in which there was no plague, but where building operations were carried out for departmental reasons. Here also the same increase of mortality, a very decided one, is shown in the total mortality statistics with and after the building.

It is interesting to learn what are the features of house improvement as a plague policy which constitute a possible cause of malaria. These are :—(1) the substitution of a tile roofing for a thatch roofing ; (2) the temporary removal of roof altogether ; (3) the interior ventilation of the new houses, which substituted light and moving air for the darkness and smoky stuffiness of the old house ; (4) borrow pit digging for material to make tiles and bricks ; (5) the rate at which work had to progress, preventing elaboration of clearing up operations ; (6) the incursion of workers from outside districts. All these factors probably combine to upset the equilibrium of comparatively restful conditions. Some suggestion is also made of an economic factor, which, with money scarcity due to indebtedness of the people to their government for the improvement of their villages, might have led to

some nutritional deterioration and therefore to a lowering of resisting powers. This idea is not, however, regarded as being a real factor in the malarial epidemic situation which has presumably arisen. A reference is made towards the end of the article to an English dictum, which is quoted as :—" In malaria the engineer is the enemy of the hygienist."

W. F. Harvey.

RAFFAELE (G.) & LEGA (G.). Osservazioni su di un ceppo etiopico di *Plasmodium falciparum*. [**An Ethiopian Strain of** *P. falciparum*.] —*Riv. di Malariologia*. Sez. I. 1937. Vol. 16. No. 5. pp. 388–397. With 14 coloured figs. on 1 plate. English summary.

Some of the malignant tertian cases observed by the authors in Italian East Africa harboured parasites whose morphological characteristics differed considerably from those of the typical *P. falciparum*. These differences were sufficiently marked to justify the appellation *P. falciparum* var. *aethiopicum* of the strain in question. The authors experienced much greater difficulty in infecting Italian strains of *A. maculipennis* with this variety of the parasite than with typical strains of *P. falciparum*. The crescents of the *aethiopicum* variety are shorter and broader than typical crescents, the difference being from 0·5 to 1μ. They are less falciform in shape ; this applies specially to the male gametocytes. Flagellation takes place much more rapidly, from 3 to 5 minutes as compared with 15 to 20 minutes for typical strains. The ring forms of the *aethiopicum* variety are larger, 3·75μ in diameter as compared with 2·66μ for typical strains ; they are less constantly circular in outline and their chromatin granules are somewhat coarser, rather like those of young quartan trophozoites. Pigment appears somewhat later than in typical forms. *N. W.*

RUSSELL (A. J. H.). **Quinine Supplies in India.**—*Records of the Malaria Survey of India*. 1937. Dec. Vol. 7. No. 4. pp. 233–244.

This is an interesting account of the present position regarding the production of cinchona derivatives in India. India still produces somewhat less than half the total amount (about 200,000 lbs.) of quinine salts consumed each year by her population. That the production could be very largely increased is undoubted, possibly even to the point of making India quite independent of outside supplies. The circumstances that have led to this somewhat anomalous situation are outlined. The amount of quinine consumed each year is certainly not more, and probably much less, than a third of the amount that would be required did not ignorance or poverty, or both, place the drug outside the reach of millions of sufferers from malaria. The provision of adequate treatment for the malarious sick in India is a complex question, and the more important of the complexities are clearly discussed by the author. After an introduction describing the vicissitudes accompanying early attempts at cinchona planting in India and Ceylon the following matters are discussed : the quinine question from a world economic point of view ; the policy of the Government of India ; estimated needs and present consumption of cinchona derivatives in India ; cost of production and the possibility of effecting a reduction in price ; the possibilities of extension of cinchona cultivation in India ; the possibility of effecting mass treatment with cinchona alkaloids in India, and, lastly, the means for popularisation of quinine in India. *N. W.*

Miyahara (Hatuo), Morisita (Kaoru) & Isioka (Hiozo). **Studies in the Treatment of Malaria. XVIII. On the Therapeutic Value of Quinine Ethylcarbonate (Euquinine).**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1938. Feb. Vol. 37. No. 2 (395). [In Japanese pp. 186–194. [12 refs.] English summary p. 195.]

"The therapeutic value of quinine ethylcarbonate (euquinine) on chronic malaria (total, 15 cases) was summarized as follows.

"Euquinine is one of the schizont-remedies, as it reduces markedly and rapidly schizonts of every species, but has no effect on the gametocytes of plasmodium falciparum. Its action against the paroxysm and persistence of the parasites is almost equal to that of other quinine salts. But its permanent-cure-rate determined by the 8-weeks-after-observation method is lower, especially on benign tertian malaria, than those of other quinine salts. The nature of its by-effects is the same as those of other quinine salts, however the intestinal disturbance is very mild or absent altogether. From the above results, we reached the conclusion that the therapeutic value of euquinine in the mass-treatment was low, because euquinine was most widely used by children who were the source of the infection of malaria in the field, and its cost was high. The drug used in the mass-treatment must be more powerful in permanent-cure-effect and cheaper in cost than euquinine."

Miyahara (Hatuo). **Studies in the Treatment of Malaria. XVI. On the Therapeutic Value of the Cinchona Total-Alkaloids (Takequina) in Malaria.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1937. Dec. Vol. 36. No. 12 (393). [In Japanese pp. 2609–2618. [10 refs.] English summary p. 2619.]

Takequina is a totaquina containing 40 per cent. quinine. Nine cases of benign tertian, 4 of quartan, 3 of malignant tertian and 4 cases of mixed infection, benign and malignant tertian, were treated with takequina. The treatment lasted 14 days, 0·8 gm. a day. The relapse rates were benign tertian 46 per cent., malignant tertian 20 per cent., and quartan *nil*. The author considers this cheap remedy to be eminently suitable for mass treatment. *N. W.*

Bellon (J. G. F. L.) & Kerny (M. M.). Les antimalariques synthétiques dans le traitement du paludisme. [**Synthetic Anti-Malaria Remedies.**]—*Rev. Service Santé Milit.* 1937. Oct. Vol. 107. No. 4. pp. 491–512. [36 refs.]

A good description of the synthetic drugs in their use in the treatment of malaria. The chemical properties, therapeutic action, dosage, methods of administration, and indications and contra-indications for the use of each are adequately described. The paper contains nothing new or original. *N. W.*

Matilla (Valentin), Fábrega (José Maria) & Vich (Antonio). Ueber unsere heutigen Erkenntnisse in der Malariabehandlung. [**Our Present Knowledge of the Treatment of Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Mar. Vol. 42. No. 3. pp. 95–107.

The authors describe their own scheme of treatment with atebrin and plasmoquine, which is on the usual lines, thus they give them in the

proportion of 10 parts of atebrin to 1 part of plasmoquine, and their dosage for persons over 10 years is atebrin 0·3 gm. daily for 7 days followed by a pause of 3 days, then plasmoquine in a dose of 0·03 gm. is given daily for 5 days. Proportionately smaller doses of these drugs are given to persons of various age periods under 10 years. They conclude that by their method of treatment with atebrin and plasmoquine in 100 cases of malaria (75 cases of benign tertian, 23 cases of malignant tertian and 2 cases of mixed infection) they got not only a rapid clinical and parasitological cure, but also a protection from relapses, early and late. No toxic symptoms were observed during the treatment. The two synthetic drugs are not contra-indicated in pregnancy. Atebrin is the drug of choice in blackwater fever, and, if gametocytes are present in the blood, it should be followed by a course of plasmoquine. From the economic standpoint also treatment with the two synthetic drugs is the most satisfactory.

E. D. W. Greig.

Craig (Charles F.). **The Modern Treatment of Malaria.**—*New Orleans Med. & Surg. Jl.* 1937. June. Vol. 89. No. 12. pp. 697–699.

This is a good account of the value and limitations of quinine, atebrin and plasmoquine, respectively, in the treatment of different forms of malaria. It contains nothing new. *N. W.*

Bulletin of the Health Organisation. (League of Nations.) 1937. Dec. Vol. 6. No. 6. pp. 895–1153. **The Treatment of Malaria. Fourth General Report of the Malaria Commission.**

This Report was reviewed on p. 408.

Kranzfeld (A.), Doukhanina (N.) & Poloumordvinov (A.). Essai de l'évaluation de la stabilité de l'effet curatif de l'acriquine dans un foyer du paludisme en Asie Centrale. [**Estimation of Duration of Therapeutic Effects of Acriquine in Malaria Endemic Centre in Central Asia.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 3. [In Russian pp. 339–351. With 1 chart. French summary pp. 352–353.]

In Karchi, a small town inhabited almost exclusively by railway employees and in which endemic malaria occurs, 389 cases of malaria were treated with acriquine and 94 cases with quinine. The treatment was carried out in September–November 1934, at the close of the transmission season when the number of malaria cases was declining. These cases were kept under observation, with regular blood examinations, till December 1st, 1935. The authors state that the probability of reinfection during this period of observation was almost nil ; the French summary does not state how this freedom from risk of reinfection was secured. Acriquine was given twice a day for five days the adult dose being 0·15 gm., 1·5 gm. in all. Quinine hydrochloride was administered during four three-day periods interspaced by intervals of four days ; the daily amount given to adults was 1·5 gm., in two doses. The proportion of cases that had parasitic relapses in the two groups, taking into account only those cases in which parasites were found at the beginning of treatment, was almost the same, from 43 to 44 per cent. *Vivax* relapses were four times as

frequent as *falciparum* relapses, after both methods of treatment. All the *falciparum* relapses occurred between October 1934 and January 1935; the majority of the *vivax* relapses occurred between March and June 1935. *N. W.*

TILLEMA (S.). Een en ander over malariabehandeling, korte kininekuur en atebrine. [**Short Courses of Quinine and Atebrin in the Treatment of Malaria.**]—*Nederl. Tijdschr. v. Geneesk.* 1938. Jan. 29. Vol. 82. No. 5. pp. 495–498. English summary (7 lines).

For purposes of comparison the authors treated 140 patients with quinine, 0·4 gm. thrice daily for a week, and 120 with atebrin 0·1 gm. thrice daily for a week, checking the results by daily examination of blood films. The differences between the results of the two drugs were negligible, and relapses were early and frequent. Better results were obtained if the quinine was continued for a week after the parasites disappeared, and atebrin for at least five days after. *H. H. S.*

SICAULT (G.) & MESSERLIN (A.). Vues nouvelles sur les prophylaxies médicamenteuses du paludisme. [**New Views on the Drug Prophylaxis of Malaria.**]—*Riv. di Malariologia.* Sez. I. 1937. Vol. 16. No. 6. pp. 480–494.

As a result of prolonged experience in Morocco the authors enunciate their views on the use of drugs in an anti-malaria campaign. They consider that all malariologists should have clear-cut ideas regarding a standard local treatment, a method of eradication of the disease, a method of protecting in normal times children who are less resistant than the adult population and, lastly, a method of protecting populations exposed to multiple and unusual reinfections. The authors' standard treatment comprises quinine given intramuscularly or intravenously in very severe cases, a treatment that should not be continued longer than two or three days at most. In less severe cases, and in severe cases following the quinine treatment just mentioned, quinacrine, 0·30 gm., and praequine, 0·03 gm., are given by mouth daily for five days.

When eradication of the disease is being attempted standard treatment is followed by the weekly administration of quinacrine, 0·30 gm., and praequine, 0·03 gm., to all infected persons identified either clinically or serologically, or haematologically. Such treatment is supplemented by attention to anopheline breeding places. Attempts at eradication of the disease are of course only possible in places where anopheline infestation is moderate and the disease not widespread, more especially in towns or in limited areas of intensive cultivation, for example.

For clinical prophylaxis among a population living in a moderate or severe endemic zone, and consequently premunized, it suffices to treat the children and the sick. Quinacrine and praequine are given at intervals that are determined by the intensity of anopheline prevalence and the prevalence of gamete carriers, every 8, 10 or 15 days according to circumstances. In communities that are sufficiently premunized and are threatened with an unusual outbreak the whole population will have to be treated at intervals determined as before. The relation of the parasite index of children to that of adults and the splenometric index are used to determine the state of premunition

of the community. The weekly distribution of drugs has sufficed in all cases in Morocco ; bi-monthly distribution has proved insufficient when anophelines have been extremely prevalent. *N. W.*

Mezincescu (D.) & Cornelson (D. A.), with the collaboration of C. Lazar & L. Buşila. Sur l'efficacité de l'atébrine et de la quinine dans le traitement prophylactique du paludisme. (Deuxième mémoire.) [**The Value of Atebrin and of Quinine in the Prophylactic Treatment of Malaria : Second Report.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1937. June. Vol. 10. No. 2. pp. 171–183.

The first report on this experiment was noted in this *Bulletin*, 1937, Vol. 34, p. 159. During 1935 from the 1st of June to the 1st of November the administration of atebrin and quinine was continued as before except for a control group which this year was left without any treatment at all. Of the 271 persons in the village 101 received atebrin, 99 quinine, and there were 71 controls. As before adults received 0·050 gm. of atebrin or 0·40 gm. of quinine each day ; children received smaller doses according to age. The blood of all was examined twice a month during the period of drug administration and once a month for the rest of the year. Between June and October when the drugs were being given the parasite index in the atebrin group was 1·9 per cent., in the quinine group 1·8 per cent. and in the control group 15·1 per cent. There were practically no cases of clinical malaria in the treated groups.

In 1936 there was no prophylactic use of drugs but the village was kept under as careful observation as before. During this year there were 33 cases of malaria among what had been the atebrin group, 26 cases among the quinine group and 13 among the control group. The average parasite rate for all three groups was 7·8 per cent. These figures illustrate the usual endemic conditions one finds in untreated villages in the neighbourhood. *N. W.*

Parrot (L.), Catanei (A.) & Ambialet (R.), with the co-operation of J. Clastrier. **Comparative Experiments in Mass Prophylaxis of Malaria by Means of Quinine and of Synthetic Drugs (Quinacrine and Praequine).**—*Bull. Health Organisation.* (League of Nations). 1937. Oct. Vol. 6. No. 5. pp. 683–765. With 23 figs.

This is an account of experiments carried out in accordance with a programme elaborated by the Malaria Commission of the League of Nations. The tests were to comprise the daily administration of small doses of quinine, or of quinacrine, to the entire population of two malarial areas, throughout the transmission season ; the systematic treatment of all cases of malaria detected in another malaria district during the same season, by means of either quinine or quinacrine, alone or combined with praequine ; and the medical and microbiological observation of these groups and of a control group, until the following transmission season. No other protective measures were to be adopted.

The district in Algeria selected for these experiments was R'oufi. It is some 200 kilometres from the Mediterranean and very near the Sahara. The population of Berber origin number 2,200. They live in a deep canyon that has been excavated by a torrent, the Oued el

Abiodh, and grow crops on the alluvial deposits of the river. Each tribe, of which there are eight, occupies two villages, one situated at the bottom of the canyon, and the other perched on the plateau ; the latter is used as a winter and spring resort. At the beginning of July they migrate to near-by high mountains where they stay about a month. The population is a poor one. In November 1934, after the epidemic season, the mean splenic index was 39·3 among children under 15 ; the mean parasite index was 17·5. Of the parasite carriers 64 per cent. harboured *falciparum*, 23·5 per cent. *vivax*, and 12·5 per cent. *quartana*. Three Anopheles are found, *maculipennis*, *hispaniola* and *marteri*. *A. maculipennis* is found only at the mouth of the canyon where the Oued el Abiodh forms a marsh. *A. marteri* is a wild species that plays no part in malaria transmission. *A. hispaniola* is found all along the river ; during low water from June to November the river constitutes an immense breeding place. When a spate occurs all larvae are swept away. This occurred several times during the summer of 1935 when this experiment was being carried out. Mosquitoes practically disappeared and there was no summer and autumn epidemic at all. It was therefore impossible to test the value of drugs as a prophylactic but there was a rarely found opportunity of watching the natural evolution of residual infection and of determining the influence of drugs on individual parasitism without the complication of reinfections.

The villages were divided into a quinine prophylaxis area ; a quinacrine prophylaxis area ; a treatment area, and a control area. The experiments are reported in very great detail ; an adequate summary in short space is impossible.

The daily administration of quinine (either aristoquine or neutral hydrochloride), 0·10 to 0·40 gm. according to age, to 294 individuals, considerably reduced splenic and splenometric rates and brought the parasite and gametocyte rates rapidly down to zero and kept them there almost constantly throughout the usual period of transmission. Comparison with neighbouring localities indicated that these improvements were due mainly to the drug's action. The reduction of the epidemic potential of the virus reservoir to zero or thereabouts justifies the conclusion that, even had weather conditions favoured mosquito breeding, transmission of malaria would have been rare in a community thus protected. The aristoquine chocolate drops were very readily taken by children.

Quinacrine, from 25 milligrammes every second day to 5 centigrammes a day, according to age, was given to 426 individuals. The endemic indices were reduced more than in the control villages but the parasite and gametocyte rates were often above zero during the transmission season. Difficulty was experienced in getting small children to take the drug in spoonfuls of syrup. The quinacrine doses given appeared to be too small, only one-sixth of the daily curative dose.

In the absence of an epidemic there was obviously no opportunity of studying the influence of the systematic treatment of cases on the trend of the epidemic. In the treatment sector only 19 cases were treated. *P. malariae* appeared to resist quinacrine longer than did the other two species.

In both the quinine and the quinacrine areas the curve of the gametocyte rate followed the curve of the parasite rate. This would be difficult to explain if these drugs have no gametocidal action.

It is true that they do not destroy, or only slowly destroy, mature gametocytes. Young gametocytes, however, in the state of undifferentiated trophozoites, are certainly sensitive to these drugs. The authors suggest that any drug with schizontocidal properties possesses gametocidal properties in regard to sexual forms in process of development and that in mass drug prophylaxis the use of a good schizonticide is sufficient. The opinion is expressed that quinine is superior to quinacrine for mass prophylaxis ; the dose in which the latter was used in this experiment was insufficient but in places where close medical supervision is not possible larger doses might not be very safe.

It was ascertained that *A. hispaniola* transmits in nature all the three species of *Plasmodium.* *N. W.*

MacCreary (Donald) & Stearns (L. A.). **Mosquito Migration across Delaware Bay.**—*Proc. 24th Ann. Meeting N. J. Mosquito Exter. Assn. New Brunswick, N. J. 1937.*—pp. 188–197. [Summary taken from *Public Health Engineering Abstr.* Wash. 1938. Jan. 1. Vol. 18. Signed James B. Lackey.]

Delaware Bay is a stretch of open water from 6 to 28 miles wide, mostly surrounded by marshes. It lies across the path of the prevailing summer winds and might be a barrier to mosquito flights on windless nights. Traps were set up on four lighthouses, located about on the midline of the bay and a record of their catches together with meteorological data secured.

Ship John lighthouse, 3·2 miles from the nearest land, gave a huge catch, 44,716, 98 per cent. being Aedes sollicitans. On one night alone 15,736 were taken. This trap caught 10 species. Elbow of Cross Ledge trap caught 7,376, including 10 species, predominantly A. sollicitans. This trap is 5·5 miles from the New Jersey shore, but 6·8 from the Delaware side. Fourteen Foot Bank, 8·4 miles from the Delaware shore, caught only 518, representing 11 species, 76 per cent. Aedes sollicitans. Brandywine Shoal, 8·2 miles from the nearest Jersey shore but 10·7 miles from Delaware, took 4,535 mosquitoes, 11 species, 75 per cent. A. sollicitans.

In view of the flight range of A. sollicitans (20–30 miles over land) its numbers are not surprising and the entire record indicates that Delaware Bay, at least in its more narrow reaches, is not a barrier of any magnitude.

Boyd (Mark F.), Kitchen (S. F.) & Kupper (W. H.). **The Employment of Multiply Infected** *Anopheles quadrimaculatus* **to effect Inoculation with** *Plasmodium vivax* **and** *P. falciparum.*—*Amer. Jl. Trop. Med.* 1937. Nov. Vol. 17. No. 6. pp. 849–853.

Three lots of *A. quadrimaculatus* were applied successively to patients harbouring *P. vivax* and *P. falciparum* respectively. After the infective feedings the mosquitoes were kept at a temperature of from 20° to 23°C. At this temperature *P. falciparum* takes a week longer to mature in the mosquito than does *vivax*. The dates of the infecting feeds were so arranged that in one lot *vivax* matured first ; in another lot *falciparum* matured first ; in the third lot both infections matured simultaneously. In all three lots the *vivax* incidence was higher than the *falciparum* incidence.

These lots of mosquitoes were subsequently used for infecting ten patients; the mosquitoes were kept in a Frigidaire in the intervals between use for inoculation. On the whole the results of these experimental infections agreed with expectations. They showed that *A. quadrimaculatus* can be simultaneously infected with *vivax* and *falciparum*. The sporogonous cycles of both species were completed within the periods expected from the temperature of incubation. The development of the first infecting species does not adversely affect the development of the second. Mosquitoes infected with the two species of malaria parasites, in the different ways described above, can successfully transmit both infections. The transmission of a single parasite by a multiply infected mosquito is attributable either to the earlier maturation of the cysts of one species or to the earlier exhaustion or normal degeneration of the sporozoites of one species.

N. W.

Boyd (Mark F.) & Kitchen (S. F.). **Simultaneous Inoculation with *Plasmodium vivax* and *Plasmodium falciparum*.**—*Amer. Jl. Trop. Med.* 1937. Nov. Vol. 17. No. 6. pp. 855–861. With 2 charts.

This paper describes the simultaneous infection with *P. vivax* and *P. falciparum* of two patients. In the case of one patient mosquitoes from two lots were used, one infected with *vivax*, the other with *falciparum*. The other patient was infected by mosquitoes harbouring both species of parasite. Both simultaneous inoculations were successful; in both cases *falciparum* was most in evidence at the beginning and the early clinical reactions were characteristic of this infection; *vivax* was only seen intermittently and not in large numbers. Later, however, *vivax* asserted itself and produced a characteristic clinical attack, *falciparum* rapidly decreasing in numbers. These events suggested an antagonism between the species. In one case, however, *falciparum* later reappeared and both parasites remained for some time at a low and equal density. *N. W.*

Swellengrebel (N. H.), de Buck (A.) & Kraan (H.). **Mechanism of Malaria Transmission in the Province of North Holland.**—*Jl. Hygiene.* 1938. Jan. Vol. 38. No. 1. pp. 62–74. With 3 figs.

Of 37,407 *A. maculipennis atroparvus* captured in human habitations 2,212 (5·91 per cent.) were infected. Of 2,028 *messeae* similarly caught only one was infected. The natural infection rate of *atroparvus* is thus 118 times higher than that of *messeae*. The anophelines were identified by the shape of the salivary glands during the period of sexual inactivity and by the structure of the floats in mature ova.

There was a sharp decrease in anopheline fertility in the second week of August coinciding with an increase of anopheline malaria; the mean temperature is then 16°C. or higher. In the third week of April, mean temperature below 10°C., fertility approaches the high level it retains till August. The blood-feeding of *Anopheles* does not begin to decline till the beginning of November. August-October is thus the period of *gonotrophic dissociation*. The decline of fertility with continued blood-feeding sets anopheline malaria going and thus indirectly determines the human malaria of the following year. Degeneration of sporozoites coincides with a fall of mean temperature to below 5°C. in the second week of December. *Anopheles* can acquire

fresh infections as late as October 7th and infection then acquired takes not more than 3 weeks to reach the salivary glands. *Anopheles* spread malaria parasites from man to man and from house to house in the autumn and man keeps the parasites alive till the next transmitting season. Anopheline malaria dies out in a house by a deterioration of the human parasite reservoir or by lack of *Anopheles*, resulting from removal of appropriate hiding places. Sometimes human parasite carriers lose their infectivity before they are free from parasites. The failure of infected *Anopheles* in a house to cause malaria among its inmates during the next year may be due to partial immunity or to unusually prolonged incubation periods. *N. W.*

Corradetti (Augusto). Ricerche sperimentali sulle preferenze alimentari delle varietà di *Anopheles maculipennis*. [**Food Preferences of** *Anopheles maculipennis*.]—*Riv. di Malariologia.* Sez. I. 1937. Vol. 16. No. 6. pp. 419–433. With 1 chart. English summary.

" The methods employed by preceding AA. to determine alimentary preferences of species of *Anopheles* and also the defects and inadequacy of these procedures are discussed . . . . .

" The method consists in allowing a group of mosquitoes, belonging to a certain species and all born the same day, to feed once a day on a certain animal, eliminating each day those mosquitoes that have bitten, until the whole is exhausted. The animal becomes more acceptable to the anopheline species the higher the percentage of mosquitoes that bite and the lower the number of days necessary to exhaust the batch. Experiments have been carried out by this method on 552 *labranchiae*, 491 *elutus*, 774 *atroparvus*, 548 *typicus* and 240 *melanoon*, to determine the alimentary preferences of each variety in respect to the blood of the following animal species : man, ox, pig, donkey, rabbit and fowl.

" The following are the conclusions :—

" (*a*) *typicus* and *melanoon* varieties show a general tendency to bite less than the other varieties under the same experiment conditions ;

" (*b*) *typicus* and *melanoon* varieties show a preference for ox blood, while the other varieties show no special preference ;

" (*c*) the adaptation index to human blood is extremely high in the *labranchiae* and *elutus* varieties, slightly less in *atroparvus* and very low in *typicus* and *melanoon*."

Sweet (W. C.) & Rao (B. A.). **Races of** *A. stephensi* **Liston, 1901.**—*Indian Med. Gaz.* 1937. Nov. Vol. 72. No. 11. pp. 665–674. With 2 graphs. [17 refs.]

Two races of *Anopheles stephensi* distinguished by egg measurements appear to exist in India.

The differentiation of the varieties of *A. maculipennis* in Europe has stimulated enquiries along the same lines in other parts of the world and on other species. In this preliminary report measurements of eggs of *A. stephensi* from many parts of India are given, on the basis of which they are found to fall into two groups. (1) The " B " type (first recognized in Bangalore) with an average of 555 microns in length, 204 in breadth, 294 in length of float and 18 ridges on the float. (2) The " M " type (first obtained in Marikanave) with an average of 476 microns in length, 160 in breadth, 218 in length of float and 13

ridges on the float. The " B " type seems hardier, feeds and breeds more readily in captivity and appears to prefer human blood. There is some indication that this is the urban malaria-carrying form. The " M " type is difficult to breed in captivity, seems to prefer animal blood and is perhaps the rural form and a poor carrier of malaria. But these points cannot be regarded as definitely established yet. When crossed the two races proved relatively infertile ; sometimes the first crosses were sterile or laid sterile eggs ; sometimes sterile eggs appeared in the next generation. The authors regard the " B " form as *A. stephensi* type form and propose to call the " M " form *A. stephensi* var. *mysorensis*. *V. B. Wigglesworth.*

Smalt (F. H.). Periodieke drooglegging van Sawah's ter bestrijding van malaria. [**Periodic Drainage of Sawahs in the Struggle against Malaria.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1937. Vol. 26. No. 4. pp. 285–299. With 4 figs. on 1 plate & 1 plan.

Every year the endemic malaria of certain districts in Bali, Netherlands India, shows aggravation with the coming of the wet east monsoon and may be regarded therefore as definitely seasonal. The author is concerned here with one aspect of the campaign against malaria, that directed towards dealing with mosquito breeding in the sawahs where the rice crop is grown. The crop is partly under water and larvae of *Anopheles aconitus* may be found in abundance in these water areas. A test examination, moreover, gave for the female Anopheles an infective index of 7 per cent., which explains the very large number of new cases of malaria in the district at the time. It is known that *A. aconitus* breeds in running water and gives rise to a fatal type of malaria.

An important fact in connexion with the antilarval measures adopted was that the cultivators of the rice crop are in the habit of periodically draining off their fields, sometimes on three successive days. By thus withholding water the further increase of new carbohydrates is limited and the transformation of carbohydrates already present is directed to the production of starch. It was considered probable that the breeding of the mosquito could be interfered with at one phase of its cycle by means of this field-drying procedure and trial was made of it. Drainage of the fields was applied over a space of almost 2 months, 7 times for two successive days, and suitable measures were taken on each occasion for determining what number of larvae were present on reflooding. The necessary controls were set up. It was found that the lethal effect of drying differed somewhat in its incidence upon nymphs, larvae and eggs respectively. The nymph was the most susceptible and the egg the least. As the development time from egg to nymph may be reckoned at about 10 days, the period for which the fields remained flooded was chosen as 9 days. The result obtained was that Anopheles larvae were reduced to 33 per cent. of their previous number by the first drying of fields and that they could be held at a figure of 27 to 33 per cent. throughout the whole period. The figures for Culex were slightly different. It was very important, however, to determine whether any economic loss could be detected in the application of this method of sanitation to rice fields. Calculation showed that the periodically drained fields had furnished 92·6 per cent. of agricultural produce compared with the normally

flooded fields. This diminution in crop may be regarded as negligible in comparison with the prophylactic importance of the measure. The measure was accordingly officially adopted in South Bali for the prevention of seasonal malaria. Other tests of the effect of drying upon the breeding cycle were carried out in the laboratory by means of artificial sawahs and petri dishes.

The general conclusion to which the author comes is that his method of purification by drying wet rice fields can be expected to kill off 75 per cent. of larvae of the *aconitus* group. Unfortunately its efficiency is limited to some extent by the presence of small rain pools which can act as breeding places. *W. F. Harvey.*

Ciuca (M.), Tomescu (P.) & Badenski (G.) with the collaboration of A. Badenski, P. Ionescu & M. Teriteanu. Contribution à l'étude de la virulence du *Pl. knowlesi* chez l'homme. Caractères de la maladie et biologie du parasite. [**Virulence of *Pl. knowlesi* in Man. Characters of the Disease and Biology of the Parasite.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1937. Mar. Vol. 10. No. 1. pp. 5–28. With 11 coloured figs. on 5 plates & 2 text figs.

——, Ballif (L.), Chelaresco (M.), Lavrinenko (M.) & Zotta (E.). Contributions à l'étude de l'action pathogène de *Pl. knowlesi* pour l'homme (considérations sur l'immunité naturelle et l'immunité acquise contre cette especè de parasite). [**Pathogenicity of *Pl. knowlesi* for Man—Natural and Acquired Immunity.**]—*Bull. Soc. Path. Exot.* 1937. Apr. 14. Vol. 30. No. 4. pp. 305–315. With 1 chart.

These two important papers have to do with the behaviour of *Plasmodium knowlesi*, one of the malarial parasites of monkeys, in the treatment of general paralysis. In the first paper are described a series of cases of town origin and which on that account had little if any previous malarial infection, while the second paper deals with cases which were from a malarial region in which a general malarial index of 90 per cent. was obtained.

The first paper states that 158 general paralytics were inoculated with *P. knowlesi* and 79·8 per cent. of these became definitely infected and revealed both fever and parasites, 16·8 per cent. had an abortive infection, while 4·4 per cent. showed only a few parasites in the blood and had no fever. In a group of 38 general paralytics who had recovered from a previous human malarial infection inoculation of *P. knowlesi* resulted in definite infection in 34 per cent., abortive infection in 42 per cent. and no infection in 10 per cent. Of 29 patients who had recovered from a *P. knowlesi* infection reinoculation was not followed by a durable infection in any one instance, though in a few cases parasites were present in the blood for a limited number of days. In general, the illness produced by *P. knowlesi* infections in man is of a mild type, even in those cases in which the blood shows a very large number of parasites. The attacks of fever varied from one to twelve and the duration of each attack was five to eight hours. The clinical features are illustrated by a number of temperature charts and descriptions of selected cases. As regards the morphology of the parasite in man, depicted in a number of well executed coloured plates, there seems to be little variation from that of the parasites in the blood of *Macacus rhesus*. Successive passages in man do not bring about any alteration in virulence either for man or the monkey.

In the second paper are given the results of the inoculation of *P. knowlesi* in a series of cases of rural origin, where a previous human malarial infection may safely be assumed to have taken place. Of 163 cases inoculated only 46 per cent. became infected. This figure is compared with a series of this type of case in which 29 patients who had previously been treated with a human malarial infection were, after recovery, inoculated with the monkey parasite. Only 17 per cent. became infected. In the rural cases the disease produced was milder than in the town series, for in 78 per cent. spontaneous recovery occurred, while in the others a single dose of fifty centigrams of quinine was sufficient to stop the fever and get rid of the parasites. On the question of immunity a previous *P. knowlesi* infection gave an absolute resistance to further infection with this parasite. If the patients had been treated previously with *P. vivax* they showed a complete resistance to the same strain of this parasite and a partial resistance to other strains and also to *P. knowlesi*.

The authors conclude that there is probably an antigenic factor common to the malarial parasites of man and the monkey, as well as an antigenic factor specific to each parasite and even to strains of the same parasite. *C. M. Wenyon.*

Schilling (Claus). Immunität bei Malaria und ihre praktische Bedeutung. [**Malarial Immunity and its Practical Significance.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1937. June. Vol. 41. No. 6. pp. 443–446.

The author puts the question: Is it possible by treatment of malaria, short of sterilizing, to allay the symptoms and to damp down the infection, and thereby lead to a labile infection and immunity against superinfection? After discussing this question he concludes by posing the following problems to be worked out by medical men stationed in endemic malarial areas:—1. What is the course of malaria in children if the symptoms and also the relapses are only so far treated with quinine or atebrin that the children develop well, increase in weight, anaemia and cachexia are checked, but the parasites are not completely killed off, that is to say, a labile infection remains? 2. In children so treated does there exist an immunity against superinfection? For the solution of this question continuous observations in hyperendemic areas on children should be made to note if relapses are less frequent and severe. Experimental reinfection might be considered. 3. Is there a sterile immunity in malaria? For the solution of this problem the best method is to transfuse large quantities of blood to persons who have never had malarial infection; in this connexion the use of the air mail will help materially by carrying blood rapidly from the immunes in a malarial area to the definitely non-immunes in a malaria-free district. *E. D. W. Greig.*

Burke (M. R.). Antimalaria Report upon the Proposed Cantonment Site at Kau Lung Tsai.—*Jl. Roy. Army Med. Corps.* 1937. July & Aug. Vol. 69. Nos. 1 & 2. pp. 1–15; 84–100. With 1 folding map.

Pereira (O. de Loiola). A epidemia do paludismo na leprosaria (rápidamente jugulada pelo musonato de atebrina). [**Outbreak of Malaria in a Leper Asylum rapidly suppressed by Atebrine Musonate.**]—*Bol. Geral Med. e. Farm.* 1937. May, June & July. Ser. 19. Nos. 5, 6 & 7. pp. 159–170.

VENOMS AND ANTIVENENES.

Ghosh (B. N.) & De (S. S.). **Investigation on the Isolation of the Neurotoxin and Haemolysin of Cobra** (*Naja naja*) **Venom.**—*Indian Jl. Med. Res.* 1938. Jan. Vol. 25. No. 3. pp. 779–786.

The authors have shown previously that by cataphoresis under suitable conditions fully two-thirds of the proteins associated with the neurotoxin and haemolysin of dried cobra venom (*Naja naja*) can be removed and that the neurotoxin can be, in part at least, separated from the haemolysin. Further purification, however, was not obtained in this way and they have made trial of fractional precipitation of proteins by electrolytes, adsorption by colloidal precipitates and subsequent elution.

By fractional precipitation with sodium sulphate, followed by adsorption on and elution from tungstic acid surface, dialysis and cataphoresis, they were able to obtain an active sample of neurotoxin free from haemolysin 17 times more toxic than the dried crude venom. The haemolysin constituent has been separated by precipitation with NaCl and further purified by heating to 86°C. which coagulates other proteins from a faintly alkaline solution, purification being further completed by cataphoresis. The final product is four times as active as the crude venom. *H. H. S.*

Siemens (Hans-Henning). Untersuchungen ueber die Toxine von Bastarden europäischer Giftschlangen. [**On the Venom of Hybrid European Snakes.**]—*Med. Klin.* 1938. Feb. 11. Vol. 34. No. 6. pp. 186–187.

The ER antivenene of the Pasteur Institute, prepared with the venoms of *Vipera aspis* and *V. berus* is a fairly potent antidote to most European snake poisons, but is powerless against that of *V. mesocoronis*. The reverse of this obtains as regards the antivenene prepared at the Vienna Institute by injection of horses with South American species of *Bothrops* venom. The serum prepared at the Behring-Werken, Marburg, with the venom of *V. ammodytes* is active also against *V. berus, V. aspis, V. latastei* and *mesocoronis*.

Opportunity was taken to carry out experiments on the venom of a hybrid of a male *V. berus* and a female *V. mesocoronis*, vipers whose venoms were serologically different. The details of the experiments are given in a protocol in the paper; the conclusion was that the venom of the hybrid showed, as regards its neutralization by various antivenenes, the properties of a *V. berus* toxin. *H. H. S.*

Link (Th.). Der Einfluss der Schlangengifte auf die Blutgerinnung. 3. Mitteilung. Australische Giftschlangen. [**Australian Snake Venoms and their Effect on the Clotting of Blood.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1938. Feb. 18. Vol. 92. No. 2/3. pp. 133–140. [13 refs.]

Four species of snake venoms were the subject of this study: the Death Adder (*Acanthopis antarcticus*), the Copperhead (*Denisonia superba*), the Tiger Snake (*Notechis scutatus*) and the Black Snake (*Pseudechis porphyriacus*).

In one per cent. solution, the first had no action on blood coagulation, the second a weak and the last two a strong action. These last three venoms after being heated to 70°C. for 15 minutes suffered considerable diminution in clotting power, which, however, was not thereby destroyed, nor was the toxicity for rabbits and guineapigs reduced by the heating.

When oxalate plasma is clotted by the *Notechis* venom much of the toxin is combined in the clot and the serum contains but a fraction, about one-fifth, of the original poison. Previous treatment of guineapigs with heparin and germanin, which prevent the clotting, does not affect the amount of the m.l.d. of venom subsequently injected. On the other hand the susceptibility of guineapigs to the Notechis venom after previous treatment with colloidal copper (which according to v. Jancsó puts the reticulo-endothelial system out of action for the time) is much reduced so that some ten times the ordinarily fatal dose is tolerated. *H. H. S.*

von Klobusitzky (D.) & König (P.). Weitere immunologische Studien ueber die gerinnungs-fördernde Substanz des Giftes der *Bothrops jararaca*. [**On the Coagulant Principle of** *Bothrops jararaca* **Venom.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1938. Mar. 22. Vol. 92. No. 4/5. pp. 418–430.

Vellard (Jehan). Variations géographiques du venin du serpent à sonnettes sud-américain, *Crotalus terrificus*, Laur. [**Geographical Variations in Rattlesnake Venoms.**]—*C. R. Acad. Sci.* 1937. May 31. Vol. 204. No. 22. pp. 1679–1681.

By a technique similar to that which he employed to determine variations in *Bothrops atrox* venom (see this *Bulletin*, 1937, Vol. 34, p. 656) the author has undertaken an investigation of *Crotalus terrificus* venom from specimens in different localities, *i.e.*, South and Central America, northern Argentine and southern Mexico. In the district north of the Panama Canal this is a transition form, *C. terrificus durissus*. *Crotalus* venom is usually yellow, but that from specimens from central and southern Brazil is white and on the borders it may be either. Those studied were snakes from Venezuela, northern Brazil (Bahia and Pernambuco, yellow venoms), southern Brazil (São Paulo white venom), the Argentine and Paraguay. In a table the properties of the Costa Rican *Crotalus* are given for comparison.

The coagulant and haemolytic properties vary but little ; both are well marked in all those studied. The coagulant is, perhaps, a little less in the yellow venoms of northern Brazil, the haemolytic a little weaker in the white venoms of the south. The Costa Rican has no haemolytic action.

The proteolytic action is marked in the Venezuela venom, and more so in the Costa Rican, but almost entirely lacking in the others. The toxicity varies inversely as the proteolytic action, being greatest with the southern, which are the most poisonous of American crotalines, high also in Venezuelan, much less in the Costa Rican. The venom of the most southerly specimens shows the limit of a gradual modification of that of the northern regions, in coagulant, phospholytic, proteolytic and neurotropic. The " centre of dispersion " of the genus is the dry regions of northern Mexico and southern United States ;

away from this the venom of *C. terrificus* undergoes progressive modification. The neurotropism increases and proteolytic action lessens, till in the Argentine and southern Brazil it is highly neurotropic.

H. H. S.

Macht (David I.). **Comparative Toxicity of Sixteen Specimens of *Crotalus* Venom.**—*Proc. Soc. Experim. Biol. & Med.* 1937. May. Vol. 36. No. 4. pp. 499–501.

Vellard has estimated the variations in *Crotalus* venom obtained from different localities (see above), the present author has tested sixteen specimens from the same place, San Diego, California—one sample of mixed venoms, two from *C. cinereus*, and the remainder from 13 different varieties.

In each case the venom was centrifuged and dried at a relatively low temperature to obviate deterioration by heat. The author studied the effect of keeping the venoms, testing them on mice and on seedlings of *Lupinus albus*. The m.l.d. for mice of 22 gm. was very variable, ranging between 0·045 and 0·3 mgm. The toxicity bore no relation to the age of the venom and the reason for difference in toxicity is not known; it may result from several factors—age of snake, health, nutrition among others. The potency of specimens of venom kept at 12–17°C. in the dark remained unchanged; saline solutions were found to deteriorate rapidly. The toxicity for plants in general was parallel with that for animals. *H. H. S.*

Taube (Harold N.) & Essex (Hiram E.). **Pathologic Changes in the Tissues of the Dog following Injections of Rattlesnake Venom.**—*Arch. Pathology.* 1937. July. Vol. 24. No. 1. pp. 43–51. With 2 figs. [13 refs.]

The authors have recorded the changes, macroscopic and microscopic, in the bodies of dogs killed by intravenous injection of *Crotalus* venom. The macroscopic findings at autopsy were: marked rigor mortis, numerous petechial haemorrhages in the palpebral conjunctiva and the tongue; haemorrhages, petechial and diffuse, in all the thoracic viscera, in the epi- and endo-cardium, and diaphragm; superficial haemorrhages on abdominal viscera, large in stomach and small and large intestines; diffuse and punctate haemorrhages in the brain—in short, the keynote was haemorrhage. S. W. Mitchell, of New York concluded that this resulted from direct effect of the venom on the vascular walls, and Fletcher and Noguchi concluded that a substance which they called "haemorrhagin," in *Crotalus* venom, caused haemorrhage by its lytic action on the vascular endothelium, by rents in the walls of capillaries and venules, not by diapedesis. The authors confirm this; they found evidence of damage to the vascular walls in all the tissues studied. At the same time the blood vessels of the tissues were engorged, and the parenchyma showed granular degeneration. The longer the duration of action of the venom, the greater the disintegration of the vessel walls. "Crotalin is an active poison which contains a principle that may be regarded as a cytolysin for endothelial cells of blood vessels and for other protoplasmic structures . . . . Its effect on the walls of minute vessels results in the physiologic manifestations and changes in tissue which are characteristic of certain types of shock" [see also Feldberg & Kellaway below]. *H. H. S.*

MARX (Walter) & PECK (Samuel M.). **Cataphoretic Separation of Toxic Components of Moccasin Venom.**—*Proc. Soc. Experim. Biol. & Med.* 1938. Feb. Vol. 38. No. 1. pp. 84–86.

Owing to the fact that the active components of snake venoms are closely related to, if not actually, proteins, attempts to separate them have not usually been very successful. By means of Todd's cataphoresis chamber, an electrical potential of 120 volts D.C. was applied to solutions of moccasin venom for three to five hours at different *p*H values. The authors were thus able to demonstrate that the venom contains two different haemolytic components. At *p*H 6 and 7 haemolysin A migrated to the anode and B to the cathode, and the latter could be separated from haemorrhagin since the latter migrated only to the anode. They conclude :—

"Our findings seem to indicate that the molecules responsible for the action of hemolysin B are different from those which give rise to the other toxic effects of moccasin venom so far studied. Hemolysin B has a much more basic character." *H. H. S.*

KYU (Kenten). Ueber die Wirkungen der Gifte der Crotalinae Formosa's. [**The Action of the Crotaline Venoms of Formosa.**]—*Japanese Jl. Med. Sci.* IV. Pharmacol. 1937. Vol. 10. No. 2/3. pp. 99–127. With 10 figs. [29 refs.]

VELLARD (J.). Une *Lachesis* peu connue du nord-est du Brésil, *L. erythromelas*. Etude de son venin. [*Lachesis erythromelas*, **a Little-known Species in North-East Brazil.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 1. p. 38.

L. erythromelas, a small snake, the largest specimen of which seen by the author was 825 mm. (33 inches) in length, has been till now confused with *L. langsbergi* which is not found in Brazil. The venom is white, with a potent coagulant action *in vitro* and *in vivo* ; intravenously injected into pigeons it is ten times as potent as that of *L. jararaca*. It has a marked neurotropic action causing progressive motor paralysis and disturbance of respiration and circulation. It is in this action that its danger lies, for an average specimen yields, by pressure of the glands, only 20–30 mgm. of dried venom.

H. H. S.

TOMOYAMA (Kazuo). **An Experimental Study of the Effect of Infra-Red Rays upon Snake Venom.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1937. Sept. Vol. 36. No. 9 (390). [In Japanese pp. 2117–2135. With 1 chart. English summary pp. 2135–2137.]

Two viperidae poisons, those of *Trimeresurus mucrosquamatus* (*A*) and of *Naja naja atra* (*B*), of the five poisonous snakes of Formosa were studied ; in particular the haemorrhagic, haemolytic and haemagglutinic properties.

First, as regards the physical effects of the rays in the case of *A* a whitish appearance was seen after 20 minutes' exposure and after 30 minutes floccules which in another ten minutes settled to the bottom leaving a clear supernatant fluid. With *B*, there was turbidity after 30 minutes, and after 60 minutes this was more marked and a few particles separated out, but there was no flocculation even after 7 hours' exposure.

Both showed decreased toxicity ; a 1 in 1,000 dilution of *A* decreased to half its toxicity in 20 minutes ; a 1 in 100 lost four-fifths of its toxicity in 30 minutes and nineteen-twentieths in 60 minutes and no longer produced haemorrhagic changes in guineapigs and mice. *B* was more resistant and the 1 in 1,000 dilution showed no changes after 40 minutes' exposure, slight loss in 1½ hours and halved in 5 hours.

A showed little alteration of haemagglutinic properties (1 in 1,000 dilution) in 20 minutes, but thereafter the loss was rapid and became *nil* after 2 hours' exposure. As regards haemolysis *A* showed less resistance to the rays than did *B* The former ran parallel with the haemagglutinic property ; practically no change after 20 minutes, but almost totally destroyed after 2 hours, only a faintly discernible haemolysis being elicited with the 1 in 1,000 dilution. With *B* there was no change after 40 minutes and very slight reduction of haemolytic power after an hour, and was still appreciable even after 7 hours' exposure. *H. H. S.*

FELDBERG (W.) & KELLAWAY (C. H.). **The Circulatory and Pulmonary Effects of the Venom of the Australian Copperhead** (*Denisonia superba*).—*Australian Jl. Experim. Biol. & Med. Sci.* 1937. June. Vol. 15. Pt. 2. pp. 81–95. With 6 figs. [10 refs.]

The authors have previously demonstrated the liberation of histamine from the perfused lung by the venom of the Australian copperhead snake (*Denisonia superba*), and they followed this up in the present article by investigating which of the symptoms of this form of snake-poisoning are so attributable by comparing the effects of histamine with those of the venom.

" The experiments were made on cats anaesthetized with ' dial ' liquid (Ciba), 0·5 cc. per kg. being injected intraperitoneally. Both vagi were cut, a tracheal cannula was inserted and the blood-pressure was recorded from the left carotid artery. The pressure in the pulmonary artery was recorded by the method described by Kellaway and LeMessurier (*Australian Jl. Experim. Biol. & Med. Sci*, 1936, Vol. 14, p. 57). In some experiments the histamine content of the lungs was determined .... The haemoglobin percentage of the blood was estimated by the Sahli method. Samples of blood were taken with a syringe from the tied femoral artery, which was kept closed with a bulldog clamp in the intervals between the successive samples. The blood in an amount of 0·5 cc. was mixed with 7 cc. N/10 HCl and kept for half an hour before testing. For the estimations we used 0·3 cc. of this mixture which corresponded to 20 cmm. of blood, the volume usually taken for haemoglobin estimation."

For the minuter changes as shown by pulse tracings and photomicrographs the original should be consulted. The article is replete with interesting observations and the main features only are referred to here. As regards the circulatory effects those of histamine and of copperhead venom are very similar—the initial fall of blood pressure due largely to peripheral vasodilatation, an interruption from output of adrenaline, and a secondary lethal fall. As DALE and his co-workers have shown in histamine shock the capillaries become more permeable and allow escape of fluid ; similar loss of fluid was noted after injection of the venom, with pulmonary oedema. The changes in the lungs resulting from injection of the venom ran parallel with the histamine content and there is an increase in the corpuscle concentration of the

blood to as much as 60 per cent., owing to fluid escape after injection of venom and " susceptibility of the lungs to cell injury, and of the lung vessels to histamine and to venom and a high histamine content of the lungs are generally associated." In other words, the effects of the venom on the lungs and circulation are due to the combination of cell injury and liberation of histamine. In kittens the histamine content of the lungs is low and the action of the venom on the pulmonary vessels is slight ; this increases with the age of the animal.

H. H. S.

Tarabini-Castellani (G.) & Cartolari (C.). Contributo allo studio dell'azione del veleno di vipera aspis sul sistema nervoso. [**The Action of the Venom of *Vipera aspis* on the Nervous System.**] —*Arch. Ital. Sci. Med. Colon. e Parassit.* 1937. Aug. Vol. 18. No. 8. pp. 451–460. With 5 figs. [10 refs.]

The authors tested on frogs the effects of *Vipera aspis* venom : (*a*) in large doses acting for a long time, injecting into the dorsal sac 0·15 cc. of a 10 per cent. dilution of the fresh venom, and noting the effect for 1½ hours ; (*b*) larger doses acting for a short time—0·3 cc. of a 10 per cent. solution, for 5 to 15 minutes ; (*c*) average doses, 0·05 cc. of the same solution watched for 1½ hours. The aim was to determine the first point of attack in the neuromuscular system. They concluded that the central nervous system was primarily affected, next the muscles, and last the nerves. *H. H. S.*

Cesari (E.) & Boquet (Paul). Détoxication du venin de *Vipera aspis* par le ricinoléate de soude ; vaccination du lapin par le venin détoxiqué. [**Detoxication of the Venom of *V. aspis* by Sodium Ricinoleate.**]—*C. R. Soc. Biol.* 1937. Vol. 125. No. 16. pp. 231–234.

Detoxication of cobra venom by oleate of sodium was noted seven or eight years ago by Renaud ; he found its action to be slow, the time of contact between the soap and the venom ranging between 8 and 15 days at 37°C. The author has employed for his investigations a 1 per cent. stock solution of Na ricinoleate from which various dilutions are made, and a 1 in 500 solution of standard *Vipera aspis* venom. The two are mixed in equal quantities, kept for 24 hours at 37°C., and injected.

For determination of the toxicity and coagulant action rabbits of 2,000–2,500 gm. weight were inoculated intravenously. With dilutions of the soap of 1 in 1,000 or less death resulted, with large clots in the heart and vessels ; with dilutions of 1 in 800 or less, coagula were rare, small and often confined to the portal vein. Of 13 rabbits injected with 5 lethal doses of the venom *plus* ricinoleate 1 in 900, 12 survived. Five hours' contact does not deprive the venom of its toxicity. The necrotizing power of mixtures of venom and soap was tested by subcutaneous injection of guineapigs, dilutions of ricinoleated venom 1 : 600 to 1 : 1,200 being used and injected under the skin of the abdomen in doses of 5 cc. or 5 mgm. of dried venom. The soap weakened the necrotizing action.

Thirdly, rabbits were injected intravenously with 1·75 mgm. of the ricinoleate venom per kilo., or two injections at a week's interval ; a week later two lethal doses, 0·7 gm. per kgm. of the venom were

injected by the same route; the animals died. If, however, three injections of the mixture, 1 : 900, were given *intra venam* at weekly intervals, the animals survived three lethal doses, 1 mgm. per kilo, of the venom intravenously injected a week later.

To sum up: Ricinoleate of sodium reduces in 24 hours at 37°C. the toxicity—coagulin and neurotoxin—of the venom of *V. aspis*, if the medium is slightly alkaline and the concentration of the soap is not too low. The necrotizing effect is reduced. Although deprived of toxicity by the soap the venom retains its antigenic functions.

H. H. S.

Feldberg (W.) & Kellaway (C. H.). **Circulatory Effects of the Venom of the Indian Cobra** (*Naia naia*) **in Cats.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1937. Sept. Vol. 15. Pt. 3. pp. 159–172. With 7 figs. [14 refs.]

"1. In cats, under dial anaesthesia, intravenous injection of cobra venom (0·25–0·5 mg. per kg.) causes an immediate steep fall of systemic pressure. Death may occur within a few minutes. If recovery of the blood pressure takes place there is a secondary gradual fall, resulting eventually in death. In cats, under chloralose, larger doses of venom are necessary to produce these effects.

"2. The immediate steep fall of systemic pressure is accounted for by obstruction in the pulmonary circulation; peripheral vasodilatation, constriction of the liver vessels and heart failure do not contribute to it. The steep fall in systemic pressure is accompanied or preceded by a rise of pressure in the pulmonary artery and a fall of pressure in the pulmonary vein. Venom injected into the femoral artery causes immediate vasoconstriction in the hind limb.

"3. The late gradual fall of systemic pressure is accounted for by fluid loss from circulation, probably associated with peripheral vasodilatation, haemorrhagic oedema of the lungs and, in some cases, failure of the heart action."

Feldberg (W.) & Kellaway (C. H.). **Circulatory Effects of the Venom of the Indian Cobra** (*Naia naia*) **in Dogs.**—*Australian Jl. Experim. Biol. & Med. Sci.* 1937. Dec. Vol. 15. Pt. 4. pp. 441–460. With 10 figs. [20 refs.]

By a series of carefully performed experiments—for details of which the reader must consult the full article—the authors have investigated the effects of Indian cobra venom on the heart, on the pulmonary circulation, the lungs, the peripheral vessels, the liver and portal circulation and the lymph flow in dogs. They found that after one injection of 0·2–2·9 mgm. per kilo. body weight the arterial blood pressure falls, though the larger dose may give rise to a transient pressor effect. Subsequent injections, if small, had no effect, if large, caused rise in pressure. The fall is accompanied by similar drop in venous pressure and is, therefore, not caused by heart failure, though such may occur (with rise in venous pressure) after large doses of 1·5–2·0 mgm. per kilo. Subendothelial haemorrhages may be found in the left ventricle. There is no rise of pressure in the pulmonary artery nor pulmonary oedema; hence the fall of arterial pressure is not due to pulmonary obstruction. It is the result of vasodilatation in the hind limb vessels, with a primary contraction of the splanchnic vessels; this may account for the transient rise of pressure after

injection of large doses, referred to above. Engorgement and haemorrhage in the mucosa of the duodenum, and less in the small intestine are seen post-mortem. With the fall in systemic pressure there is rise of portal vein pressure and constriction of hepatic veins. The systemic capillaries are more permeable and the loss of fluid leads to increased Hb concentration of the blood; the lymph-flow is increased and the fluid contains blood corpuscles. *H. H. S.*

Chopra (R. N.), Mukherjee (S. N.) & Chowhan (J. S.). **Physical Changes in Blood** *in vivo* **after Injection of Venom from Indian Cobra** (*Naia naia vel tripudians*) **into Monkeys.**—*Indian Jl. Med. Res.* 1937. July. Vol. 25. No. 1. pp. 137–145. With 1 fig. [17 refs.]

"(1) The changes in surface tension and viscosity on injection of cobra venom are opposite in direction and indicate a probable rise in protein concentration in the plasma.

"(2) The alterations in the plasma reaction and the buffering properties are parallel and these have been traced to the carbon-dioxide tension due to the influence of the venom on the respiratory centre.

"(3) The surface charge of red blood cells alters in such a way that it seems that this also has some rôle to play in the coagulation of blood in presence of venom.

"There is but a slight indication that the electrokinetic potential has an influence on venom haemolysis which requires further corroboration."

MISCELLANEOUS.

COLONIAL OFFICE: ADVISORY COMMITTEE ON EDUCATION IN THE COLONIES. **Memorandum on the Education of African Communities.**—Colonial No. 103. 24 pp. 1935. London: H.M.S.O. [6*d*.]

The value of "rural reconstruction" as a means of improving the health of the mass of the people in the colonies, and the importance of increased facilities for the education of girls and women so that they may play their part in promoting health in the village are matters of much concern to medical authorities to-day. The above memorandum therefore should be of considerable interest to them as the authors recognize clearly the need for co-operation between medical and educational agencies.

The memorandum deals with the education of the general mass of the population, particularly those living in rural areas. Its aim is to show the educational significance of the inter-relation of all the factors in community life. "Experience of the education of rural communities in different countries tends to show that efforts to educate the young are largely wasted unless a simultaneous effort is made to improve the life of the community as a whole . . . . Poverty, malnutrition, insanitary conditions and habits, ignorance, superstitious belief, hampering traditions, are all interdependent factors, no one of which can be dealt with effectively in isolation."

There is a close connexion between educational policy and economic policy and there must be close collaboration between the agencies responsible for public health, agriculture and schools.

Teachers in African villages need to acquire, in their training, an interest in all that pertains to the life of the community.

Co-operative Societies may prove a valuable instrument for the advancement of African communities.

Sociological research, to be undertaken by investigators who have received a thorough training in modern social and psychological science, is needed.

Programmes of rural reconstruction require the combined effort of various departments under the guidance of the government of the territory. It is important to enlist the help of voluntary agencies, and Native Authorities should be related as closely as possible with the execution of the programme. The policy should be to encourage African initiative, self-help and responsibility.

The fundamental importance of the education of girls as essential for community advance is recognized. Jeanes schools are stated to be proving valuable in this matter in certain localities. "Health," the authors say, "is the foundation of any improvement in the life of the individual and the community . . . ." Health propaganda among the young will be to a large extent wasted effort unless it is linked up with a campaign conducted by the medical department among the adult members of the community and especially among women.

Finally the lines along which progress can most hopefully be attempted are given as:—

(*a*) The progressive transformation of existing efforts for the education and welfare of African communities by their closer correlation with other activities and their increasing integration with the whole life of the community.

(*b*) The provision of opportunities for selected individuals to study the best methods of rural reconstruction.

(*c*) The training of those looking forward to service in Africa by courses on rural reconstruction during their preparation, or in summer schools which might also be attended by officers or missionaries on leave.

(*d*) Intensive experiments in the improvement of the life of rural communities in one or more selected areas where the conditions are favourable and where the right personnel is available.

Mary G. Blacklock.

Williams (Cicely D.). **Child Health in the Gold Coast.**—*Lancet.* 1938. Jan. 8. pp. 97–102. With 4 figs. [Summary appears also in *Bulletin of Hygiene.*]

This article by a woman medical officer, formerly in the Gold Coast and now in Malaya, is an abbreviation from a thesis for the D.M. Oxon. It gives an interesting account of the environment, customs, mode of life, and diet of the community as they affect the health of children.

It is probable that less than 50 per cent. of the babies born alive survive to maturity. With a diet rich in carbohydrates and deficient in proteins, fats and mineral salts, malnutrition is the most serious problem, both as a direct cause of death and by preparing the soil for the acute infections. Malaria, which is very prevalent, does most harm between the ages of three months and three years, after which there is a gradually developing tolerance. Other important causes of ill-health and death are intestinal diseases, helminthiasis, and pulmonary complaints. Yaws is still prevalent in rural areas but rare in the towns, where treatment is readily obtainable.

The author concludes that: (1) most of the ill-health is preventable; (2) the care of children in the toddler stage is of supreme importance; (3) improvement can only be effected by general health education and by the training of efficient [? African] health visitors; (4) preventive work must go hand in hand with curative if the confidence of the people is to be gained; (5) co-operation with the agricultural, animal health, and education departments, and with the administrative service is essential.

W. H. Peacock.

Achard (Ch.). Voyage médical à Madagascar. [**A Medical Tour of Madagascar.**]—*Bull. Acad. Méd.* 1937. Dec. 28. 101st Year. 3rd Ser. Vol. 118. No. 40. pp. 788–803. With 2 figs.

Dr. Ch. Achard visited the Comoro Archipelago and Madagascar between July and September. He reports on the general organization of the Health Services and the measures taken against the chief diseases.

The number of beds in Madagascar for the sick and maternity cases is 5,753. [The population is given in hand-books as 3,853,000.] Three aeroplanes are in use for transport of sick and wounded or to take medical assistance to them. The author travelled 800 kilometres in one and reports favourably on the comfort. In the last year the distance flown was 25,100 kilometres. The medical personnel consists of 56 European doctors and 302 native doctors, trained at the School of Medicine at Antananarivo, founded in 1896; there are also 128 in

private practice, in all one native doctor to 7,000 inhabitants. The course is five years. Graduates must remain in Government service for ten years, after which they may practise freely when authorized for stated localities.

A school of midwives was formed in 1897; it has trained 560, 364 of whom are now working in health centres and 82 are in private practice after five years of work under Government. The course of study is three years. There is one midwife for 8,000 islanders.

Almost all the native doctors and midwives are of Hova race. They are well accepted in most districts but, owing to race jealousy, not in all. In general, they do their work well especially where there is good contact with the French doctors. Among special institutions are mentioned the Institut Pasteur, the Institute of Hygiene (the centre of measures against malaria, syphilis, tuberculosis and leprosy) and a Plague service which is closely linked with the Pasteur Institute. It is noted that 52 per cent. of native women are delivered in the maternity hospitals and that the maternal mortality is 4·3 per cent. Warm clothing is furnished to infants in the cold regions and all mothers on discharge receive a layette. There are private services under the Red Cross and religious institutions, including five leper colonies.

The author points out that the colonial medical officer is at present "a synthetic doctor, a plurivalent practitioner," capable of practising medicine, surgery and obstetrics as well as the special subjects. He thinks that before long specialists will take the place of some of these doctors.

Among the diseases of Madagascar *malaria* comes first. It is more prevalent on the plateau than on the east or west coast. The Anopheles concerned are not mentioned. The disease is combated with quinine, and cinchona is cultivated. *Syphilis* is widespread; there is no mention of *yaws*.

Smallpox does not appear in the last annual return. Vaccinations number between 300,000 and 400,000.

Plague is serious especially in the central zone. Of 1,363 cases, 663 were bubonic, 258 septicaemic, and 442 pulmonary. All of the last two and 88 per cent. of the bubonic died. The chief measure taken is vaccination with vaccine locally prepared. It is well accepted and compulsion is not needed. Figures are given showing that to reduce the incidence a large proportion of people must be immunized. "Where 70 to 80 per cent. of inhabitants are vaccinated, plague disappears."

The author compares conditions in Madagascar with those of Africa. In Madagascar civilization had begun before the French occupation. The Hovas, who are the élite of the island, have Asiatic traits; more can be expected of the Madagascan doctor than from the African.

A. G. Bagshawe.

South African Institute for Medical Research. **Annual Report for the Year ended 31st December, 1936** [Lister (Spencer), Director].—98 pp. With 2 plates. Johannesburg: P.O. Box 1038.

The following are among the many interesting subjects dealt with in this Report :—

Pneumonia.—From a study of the bacteriology of workers in local mines it was found possible in 1936 to produce a single " community autogenous vaccine." Large scale controlled experiments in its prophylactic use are in progress in certain mines. In an outbreak of pneumonia in an unvaccinated mine population pneumococci of Types I & II predominated in typical lobar cases.

Haemolytic Streptococci.—Classification of human Group A strains is proceeding.

Meningococci.—Intracerebral and intraperitoneal animal inoculation are under investigation as means of obtaining a rapid classification. Of 97 strains obtained from cerebrospinal fluid about 60 per cent. fell into Group I [Gordon's I & III].

Plague.—Dr. PIRIE reports an apparently steady diminution in the virulence of *P. pestis* obtained from both human and animal sources. Dr. GIRARD's attenuated strain, " E.V." has been obtained from Madagascar and has been found to give a better protection, used as a live vaccine on rats, than a killed vaccine. This strain is also in use in the preparation of an antiserum, with which experimental results to date are very promising.

Tuberculosis.—An attempt is being made to determine the part played locally by bovine bacilli in human tuberculosis. The first 38 cultures obtained all proved to be human in type.

Enteric Fevers.—Following satisfactory results from the use of typhoid endotoxoid vaccine in two injections, a single dose, giving agglutination titres of 1/1,000 to 1/5,000 " O " and 1/10,000 " H " has been under trial [GRASSETT & LEWIN (1936)].

Alum precipitated typhoid endotoxoid is also being tested for human immunization. By use of Vi strains in the production of typhoid endotoxoid vaccine, it is claimed that the original immunizing properties are retained in a soluble atoxic form. Of 242 strains of typhoid bacilli recently isolated from patients, 7·86 per cent. belonged to Kauffman's Vi group, 90·39 per cent. were intermediate, V–W, and 1·75 per cent. were devoid of Vi antigen, W group.

An investigation in the preparation of typhoid serum showed that the best protection of mice against both Vi and O typhoid strains was obtained by using a mixture of equal parts serum prepared from endotoxoid and of anti-Vi serum. Such a mixture is to be tested clinically. Vi agglutination to a titre of 1/25 was not found constant in the serum of 5 proven typhoid carriers.

Industrial Hygiene.—Dr. MAVROGORDATO has continued the study of underground air-borne dust. The following tables show the decrease in general average dust and the increase in average duration of underground work of men developing silicosis.

General Average of Dust in Mgm. per Cubic Metre.

Years.						
1909	1911	1914	1916	1920	1924	1935
20 mgm.	14 mgm.	5·5 mgm.	3·9 mgm.	2·6 mgm.	1·1 mgm.	0·8 mgm.

Average Duration of Underground Work of the Silicotics detected in the Years Considered.

Years		
1918/20	1929/32	1934/35
9 years 7 months	13 years 6 months	16 years 7 months

The mass distribution of the dust particles has been studied in terms of their size. It appears that 90 per cent. of the mass is composed of particles of 4 microns and less, with main mass composed of particles of about 2 microns. This distribution has been found to hold down to 0·6 mgm. per cu. metre, and the gradual decrease of dust tabulated above has therefore been chiefly affecting the particles of size between 2·5 to 1·5μ, and it is the reduction in this range that is believed to be associated with the fall in the dust hazard, and perhaps not so much importance need be attached to the ultra-small but very numerous particles of 0·8μ or less. With dust at 1·0 mgm. per cu. metre the most susceptible subjects have been requiring 10 years' exposure, so the average exposure is expected to be 20–25 years. With the increased exposure necessary to produce silicosis, the excess tuberculosis rate is becoming less marked on the Witwatersrand, and it seems that bronchitis and cardiac failure in the 6th and 7th decades is taking the place of tuberculosis in the 4th and 5th as the dominant complication.

Biochemical investigations under Dr. F. W. Fox have again centred on nutritional questions, particularly as regards vitamins. "The practical conclusions . . . are that when it is desired to conserve anti-scorbutic activity, green vegetables should be cooked in the minimum of water or preferably steamed, potatoes should be cooked in their jackets, aluminium or enamelled ware should be used in preference to copper or iron, and cooked and even raw vegetables should not be allowed to stand for longer than is absolutely necessary before being served." Many further tests have confirmed the few results of the previous year which indicated that the average Native mine labourer works with a much lower level of antiscorbutic vitamin than the average European.

Cancer Research.—Dr. DES LIGNERIS has found changes in the characters of Rous sarcoma No. 1, the Fujinami myxosarcoma and of another tumour produced in 1935. The tumours have lost their filtrability and their ability to form metastases. This has been associated with a chronic Salmonella infection and consequent poor quality of the fowls used for passage. Further work is being directed to the investigation of such an antagonism between tumour agent and bacterial products.

Entomology.—Control of midges (*Chironomus*) was successfully achieved in an artificial lake in Port Elizabeth by increasing the proportion of salt water. A contrast is drawn between an area in which *A. gambiae* is the chief carrier of malaria and another in which *A. funestus* is responsible. In the former it is concluded that there is probably a cessation of mosquito-borne malaria in winter, but not in the latter area. Attention is therefore drawn to the possible importance of movement of labour from a *funestus* area into *gambiae* areas as supplementing the human reservoir of infection. Two types

of sporozoites had been noted to result from dissection of Anopheles in distilled water. It was found that unswollen sporozoites showed a divided nucleus when stained, while swollen sporozoites had a simple undivided central nucleus. It was suggested that the type with the divided nucleus represented an advanced stage of development which might be necessary before human infection can take place.

Among routine investigations two cases of *Cysticercus cellulose* of the brain are noted, and a third brain cyst proved to be the cyst of *Taenia multiceps*, a parasite of dogs. Of 26 histological specimens showing bilharzial ova, 14 were appendices. Three additional cases of rhinosporidial infection of the conjunctiva have been added to the two previous cases. *P. H. Martin.*

CHAKRAVARTI (D. N.) & TYAGI (N.). **Studies in "Effects of Heat." Part I. Biochemical and Physical Changes in Ten Cases suffering from "Effects of Heat."**—*Indian Jl. Med. Res.* 1938. Jan. Vol. 25. No. 3. pp. 791–827. With 2 figs. & 5 charts. [34 refs.]

The object of this investigation was to study the biochemical and physical changes in blood and urine in subjects suffering from "effects of heat," and the possible relationship between such changes and the clinical symptoms produced. The authors' biochemical findings are fully set out in a series of tables, and these results are discussed and explained, but much of the information is given in a form which does not lend itself to further concentration. Their summary includes the following :—

"A tendency towards retention of nitrogenous constituents in the blood has been observed. This along with the increased blood creatinine and inorganic phosphates, and low blood calcium figures suggests the possibility of kidney insufficiency in severe cases of heat stroke. The presence of albumin, casts, etc., in the urine of such cases supports the suggestion.

"The low chloride findings in blood and urine reported by previous workers have been confirmed.

"An increase in blood-lactic acid and other anions has been observed.

"It is suggested that a possible contributory factor to hypochloraemia in heat-stroke cases is the high anion concentration in blood."

In appendices there are given details of technique, with illustrations of apparatus ; and clinical summaries of the ten cases investigated.

An extension of the investigation is promised.

W. P. MacArthur.

SERRA (Giovanni). Il metodo di Maurizio Ascoli e le splenomegalie dovute ad affezioni tropicali. [**Ascoli's Method of Treatment and Splenomegaly associated with Tropical Diseases.**]—*Riv. Sanitaria Siciliana.* 1937. Dec. 15. Vol. 25. No. 24. pp. 1431–2, 1435–8, 1441–4, 1447–8. With 16 figs.

This paper contains a lengthy dissertation on the pathological conditions, other than malaria, met with in the tropics, in which enlargement of the spleen and liver is a prominent symptom. In a series of such cases treated at Albertville in the Belgian Congo, in which malaria, syphilis and other tropical diseases contributed to the splenomegaly, the author has had considerable success in combining Ascoli's method of treatment by intravenous injections of adrenalin with the specific treatment of the disease in question. In many

cases so treated improvement was more rapid and more marked than in similar cases submitted to the usual specific treatment alone.

Norman White.

Le Tallec (C.). Vingt-sept cas d'ulcères tropicaux traités par la bile de boeuf. [**Tropical Ulcer treated with Ox-Bile.**]—*Bull. Soc. Path. Exot.* 1937. Dec. 8. Vol. 30. No. 10. p. 923.

The author has treated 27 cases of tropical ulcer by means of ox-bile. This is heated in a water-bath at 100°C. for ten minutes ; is then allowed to cool and applied drop by drop to the ulcer and an ordinary dressing applied. This is carried out daily or on alternate days and in 20–30 days at most, says the author, healing is attained ; the longer period if the ulcer is of large extent. All pain ceases after 2–3 days' treatment. The treatment is simple and costs practically nothing. *H. H. S.*

Cossio (Aligi). Simpatectomia periarteriosa nelle ulcere tropicali. [**Tropical Ulcer treated by Periarterial Sympathectomy.**]—*Ann. di Med. Nav. e Colon.* 1937. Nov.–Dec. 43rd Year. Vol. 1. No. 11–12. pp. 545–550. [44 refs.]

The author suggests that refractory cases of ulcus tropicum may react well to periarterial sympathectomy on the grounds that the ulcer arises from, or is kept up by, inadequate blood supply. He gives brief notes of eight cases and records cure in 2 weeks to 3 months in six of them. *H. H. S.*

Keevill (A. J.). **Onyalai.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Mar. 17. Vol. 31. No. 5. pp. 572–573.

The author puts on record details of two cases of onyalai, or some condition very closely resembling it, which he met with in Unyamwezi in the Western Province of Tanganyika Territory. The first patient was a girl of 10 years who had been ill for two or three days. When seen she was moribund, haemorrhagic bullae were present in the buccal mucosa and in the palatal submucosa, and there was blood oozing from the mouth and nose ; she was intensely jaundiced. Death took place a few hours after admission to hospital.

The second was a woman of 40 years who had had a bloody diarrhoea the day before admission. She was dull, listless, the palatal mucosa was studded with haemorrhagic bullae 5–10 mm. in diameter ; vaginal haemorrhage came on soon after her admission, then bleeding from mouth and nose. She was treated first with Ca lactate, without benefit, then with injection intramuscularly into the gluteal region of 10 cc. of whole blood from her husband. The vaginal haemorrhage continued but there was no return of the bleeding *per anum* and no haematuria. She was three days in hospital, when the temperature was subnormal. Her friends then took her away and she was reported to have died on the next day, after a total illness of five days. The disease is very rare in this district and much dreaded. There is no local name for it ; the term *Kafindofindo* being used for any acute inflammation of tonsils or pharynx. *H. H. S.*

HORWITZ (M. Thomas) & TUNICK (I.). **Ainhum. Report of Six Cases in New York.**—*Arch. Dermat. & Syph.* 1937. Nov. Vol. 36. No. 5. pp. 1058–1063. With 2 figs. [36 refs.]

A report upon six cases of ainhum all negroes living in Harlem, New York. One had migrated from the West Indies, the others came from the southern States. All were between 40 and 47 years of age ; 4 males, 2 females. The fifth toe was affected in all with bilateral involvement in one patient. No evidence in regard to causation was forthcoming. Clinically they were typical. The radiographical picture showed constriction and rarifaction of the bone in varying intensity with ultimate fragmentation and absorption.

The author gives a review of the literature on the subject and a useful bibliography. *H. S. Stannus.*

LODDER (J.) & MÜLLER (H.). De ziekte van Winiwarter-Buerger. [**Winiwarter-Buerger Disease : Thromboangiitis obliterans.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1937. Dec. 28. Vol. 77. No. 52. pp. 3315–3329. With 8 figs. on 2 plates. English summary (5 lines).

This disease with its histological picture of obliterative thromboangiitis and its clinical picture of gangrene of the extremities is not common. Thirteen cases have, however, been observed by the authors within two years in East Java. The cause of the condition is not known but nicotine poisoning could not be incriminated in the present series of cases, for the patients were not heavy smokers. Other causes of vascular obliteration and peripheral gangrene such as syphilis, diabetes, arteriosclerosis, toxic action and Raynaud's disease were excluded before the diagnosis was decided on. Two symptoms of importance were the intense pain, which might lead a patient to beg for amputation, and the want of pulsation in the artery to the affected part. Many remedies were tried and, in one case, Leriche's operation of perivascular sympathectomy, but none of these gave any permanent benefit. Lumbar sympathectomy was not attempted. Amputations had to be performed, and well above the line of demarcation of gangrene, if the gangrene was not to recur. Histologically the usual picture of vessels with their lumen narrowed by organized thrombus, containing purulent foci and sometimes giant cells, was found. Canalization of organized granulation tissue might be seen but no elastic fibres were present in the new formed tissue within a vessel lumen : in this respect thromboangiitis obliterans differs from arteriosclerosis. Good clinical and histological photographic illustrations accompany the article. *W. F. Harvey.*

HAMILTON (J. F.). Further Report on Pseudomycosis : Indolent Leg Ulcer based on a Study of 54 Patients.—*Jl. Trop. Med. & Hyg.* 1938. Jan. 1. Vol. 41. No. 1. pp. 1–8.

MORLEY (George). **Otitis Externa : "Hot-Weather Ear." An Investigation of 100 Cases and a Method of Treatment.**—*Brit. Med. Jl.* 1938. Feb. 19. pp. 373–377. With 1 chart. [26 refs.]

When PALMER first described this condition in 1934 [see this *Bulletin*, 1935, Vol. 32, p. 73] he believed it to be of mixed ringworm and bacillary aetiology. The author here analyses 100 cases seen by him

at Aden, where it prevailed mainly in May–June and August–September. The author does not believe that sea-bathing plays any part in causation. The common infecting organism was *Ps. pyocyanea*, not a fungus, but its source was not discovered. In the acute cases pain is intense and examination of the meatus is impossible without an anaesthetic. There is fever up to 103°F., with adenitis and the meatus is almost occluded by soggy exudate, which on removal leaves a bleeding surface.

Treatment consists of gentle syringing with boric lotion as hot as can be borne, and after allowing this to drain away, the meatus is filled with 1 per cent. carbolglycerine and the ear covered in a boric fomentation. For chronic cases, the meatus is cleared of débris, then dried with ether or boric and spirit drops, after which boro-iodine powder is inserted by insufflation and the meatus closed by a wool tampon. The following is the procedure for preparing the boro-iodine powder :—

" For the preparation of iodized boric powder sublimed iodine is used in a strength of 1 per cent. in acid. boric. pulv. ; the iodine is first broken down with a few drops of alcohol 90 per cent. The boric acid is added in powder form in small quantities as quickly as possible, using a non-porous glass mortar and keeping the mixture moving all the time. As soon as the iodine appears to be evenly distributed the powder is transferred to a wide-mouthed dark glass-stoppered bottle, without waiting for complete drying. Evaporation of the iodine is very rapid ; if any delay occurs all the iodine is lost, and the use of a glass-stoppered bottle instead of cork is necessary to preserve the iodine content." *H. H. S.*

LEYVA (Jose F.), GUTIERREZ (Marciano) & MILINDALEKHA (Tong Khan). **Detection of the Alkaloid of Nami (*Dioscorea hispida*, Dennst) in Case of Poisoning.**—*Jl. Philippine Islands Med. Assoc.* 1937. Nov. Vol. 17. No. 11. pp. 693–698.

" One of the greatest handicaps in forensic analysis is encountered when an organic poison of the nature of an acid principle, glucosides, or an alkaloid . . . . is present in a sample whose chemical reactions are too little studied to [enable one to] draw a more or less reliable conclusion as to the real identity of the substance in question."

So write the authors and their dictum has been found to be very true in, *e.g.* poisoning by *Blighia sapida*, where the toxic principle is probably a glucoside and there is no known test for it. In the case of *dioscorine*, the toxic principle of *Dioscorea hispida*, the authors have in this paper recorded their work to elucidate its detection.

It proved to be an alkaloidal substance and its toxic action was tested by intragastric administration (by stomach tube) of 0·13 gm. in 10 cc. distilled water to a *M. cynomolgus* weighing 2 kilos. The symptoms resulting were : Spasm and extension of limbs, after a symptomless interval of 24 minutes, with arms semiflexed, with muscular tremor. Hyper-irritability preceded the clonic convulsions with opisthotonus, and open mouth, as if the animal were gasping for breath ; foaming of the mouth appeared, but not vomiting or sphincter relaxation ; pupils were widely dilated, respiration ceased during convulsions. Death occurred 70 minutes after administration of the poison.

Tests—colour reactions and precipitation—are detailed and to the description the reader is referred. A table giving detailed colour reactions of the pure alkaloid and the recovered alkaloid will be of

great help to the toxicologist. The distribution in the various tissues and organs is given ; most was present in the stomach and kidney and next in the blood ; little in the intestine, liver or brain, and least in the lung. Its physiological reactions simulate closely those of atropine, not strychnine. The calculated fatal dose is 0·002 gm. per 30 gm. body weight. It is interesting to note that one monkey which did not receive the full calculated fatal dose was to all appearances unaffected. The same was noticed in experiments with white mice.

H. H. S.

Nelson (C. Ferdinand) & Stoker (Ruth). **The Hemoglobin Concentrations and Erythrocyte Counts of Healthy Men.**—*Folia Haematologica.* 1937. Vol. 58. No. 3/4. pp. 333–354. With 4 figs. [43 refs.]

The paper opens with a comprehensive table which summarizes the maximum, minimum and average haemoglobin values and erythrocyte counts found by previous investigators, and indicates the respective methods employed in making the haemoglobin determinations, and, wherever possible, the occupations of the subjects examined. With few exceptions, previous observations have been made on narrow and restricted sections of the population. To overcome objections on this score the present authors drew their material from as widely different social strata as possible and from three different localities in Kansas, namely, from a metropolitan area, from a suburban community and from a military reservation ; the elevation of these places varied from 700 to 1,000 feet above sea level. All of the 350 men chosen had repeated physical examinations, and at the time the blood was examined were in good health.

Blood was drawn from an arm vein and 2 mgm. of potassium oxalate added as an anticoagulant for each cc. of blood collected.

The haemoglobin was determined by the van Slyke oxygen capacity method on 2 cc. samples of thoroughly aerated blood. For the entire group of 350 men the maximum concentration was 18·39 gm. per 100 cc. blood, the minimum 12·35 gm. and the average 15·03 gm. The maximum values of each of the 13 sub-groups and of the combined group were fairly close, and the authors conclude that with few exceptions 18 gm. of haemoglobin per 100 cc. blood represents the maximum concentration compatible with health in adult American men. The agreement of the minima was not so close, but even in the lowest cases nothing could be found to suggest any abnormality or pathological state and the authors feel that Wintrobe's minimum of 14 gm. is too high by at least 1·5 gm.

The red cell count of the larger group varied between 6·70 and 4·03 million cells per cmm. with an average count of 5·11 millions. Five of the smaller groups had maximum values of 6·0 millions and more cells, so that this value certainly seems to be within the range of good health, which agrees with certain other American observers. The minimum red cell counts, like the haemoglobin concentrations, showed greater variations, and several of the smaller groups had minimum values around 4·25 millions. Similar values have been found by other investigators and did not seem to be associated with any deviation from good health. These apparently normal cases with low counts are important and should receive careful attention ; only

repeated examinations over long periods of time will determine just how low a cell count may be compatible with good health.

There appeared to be no significant differences either in haemoglobin concentrations or in red cell counts between urban residents and those living in suburban or in country communities; nor between men working out of doors and those working inside. No significant differences were observed between the values obtained for healthy male negroes and those for healthy white males.

The average haemoglobin concentration for men between the ages of 18 and 25 was slightly lower than for men in all the other age groups, but between 25 and 65 there did not seem to be any significant differences in haemoglobin values due to age. There were no significant differences in red cell counts between the ages of 18 and 65.

Traffic officers and motor cycle policemen, who spent their entire working day in the congested traffic districts of Kansas City, did not as a group have higher maximum or average haemoglobin values or greater cell counts than suburban groups investigated.

F. Murgatroyd.

Sokhey (S. S.), Gokhale (S. K.), Malandkar (M. A.) & Billimoria (H. S.). **Red Cells, Haemoglobin, Colour Index, Saturation Index, and Volume Index Standards. Part I. Normal Indian Men: a Study based on the Examination of 121 Men.**—*Indian Jl. Med. Res.* 1937. Oct. Vol. 25. No. 2. pp. 505–528. With 8 figs. [23 refs.]

While studying the blood conditions in sprue the authors came up against the fact that they had no normal standards for Indians with which to compare their pathological findings. Indeed, the situation was not much better for Europeans either if the authors' suggestion is correct that the figures for average normal counts (5,000,000 for men and 4,500,000 for women) have been quoted from one text-book to another without proper confirmation and were originally based upon the examination of only four bloods.

When the authors began work in 1929 the only reliable figures available were those of Osgood (1926), who employing accurately standardized methods made determinations on 137 American men between the ages of 19 and 30 years. The same methods, except for the haemoglobin determination, were closely followed in the present investigation, in which examinations were made on oxalated venous blood obtained from 121 healthy young men between 19 and 30 years of age of the Bombay Presidency.

The average values obtained were red cell count 5·11 millions per cmm., haemoglobin 15·37 gm. per 100 cc. blood, and cell volume 41·72 cc. per 100 cc. blood. The haemoglobin determinations were made by van Slyke's oxygen capacity method, but Newcomer's method, in which the haemoglobin is converted into acid haematin and compared against a yellow glass disc, was found to give close agreement and to be more convenient for clinical work. The figure for cell volume is the average of those actually obtained but the question of the shrinkage of cells in oxalated blood is discussed.

Considerable number of tables and figures is given and should be consulted by those interested. *F. Murgatroyd.*

Sokhey (S. S.), Gokhale (S. K.), Malandkar (M. A.) & Billimoria (H. S.). **Red Cells, Haemoglobin, Colour Index, Saturation Index, and Volume Index Standards. Part II. Normal Indian Women : a Study based on the Examination of 101 Women.**—*Indian Jl. Med. Res.* 1938. Jan. Vol. 25. No. 3. pp. 723–739. With 8 figs. [16 refs.]

In the haematological examinations of 101 healthy young women, medical students or nurses, between the ages of 16 and 30 years, from the Bombay Presidency the authors used the same methods they employed in their previous investigation into the normal haematology of Indian men (see above). Venous blood, to which was added neutral potassium oxalate (2 mgm. per cc.), was used and in the case of the cell volumes the actual figures obtained without correction for shrinkage have been recorded ; the haemoglobin was determined by van Slyke's oxygen capacity method.

The diets of the women varied but no significant differences were found between vegetarians and those on mixed diets. None was pregnant and no attention was paid to the menstrual cycle.

The red cell counts ranged from 3·50 to 5·35 millions with a mean value of 4·47 millions per cmm. ; the haemoglobin from 10·46 to 16·01 grammes with a mean of 12·99 grammes per 100 cc. blood ; and the cell volume from 28·40 to 44·67 cc. with a mean of 36·27 cc. per 100 cc. blood. The average size of red cells in men and women appeared the same. *F. Murgatroyd.*

Sankaran (G.) & Rajagopal (K.). **Haematological Investigations in South India. Part I. The Estimation of Haemoglobin.**—*Indian Jl. Med. Res.* 1938. Jan. Vol. 25. No. 3. pp. 741–751. With 1 graph. [25 refs.]

Haemoglobin determinations of 125 male students and young doctors between the ages of 18 and 25 years, and 62 women students between the ages of 17 and 22 in Madras, were made. All subjects were apparently in good health and there was no reason to suppose that any was suffering, or had recently suffered, from malaria or helminthic infections.

The haemoglobin was determined in the following manner :— 5 cmm. of blood from the finger was lysed in 10 cc. of distilled water ; 0·5 cc. of this solution was mixed with 1 cc. of 1 per cent. benzidine reagent (1 gm. purified benzidine crystals, 20 cc. glacial acetic acid, 30 cc. distilled water, 50 cc. absolute alcohol), and then 0·5 cc. of 2 per cent. hydrogen peroxide was added. The mixture was shaken and then allowed to stand from 1 to 1½ hours during which time a purple colour developed ; 10 cc. of 20 per cent. acetic acid was then added and then after mixing, the colour of the mixture was compared colorimetrically with that obtained from a standard solution of haemoglobin treated in the same way. The haemoglobin content of the standard had been determined by van Slyke's oxygen capacity method.

The average haemoglobin value of the males was 16·57 gm., and of the females 13·73 gm. per 100 cc. of blood. *F. Murgatroyd.*

SANKARAN (G.) & RAJAGOPAL (K.). **Haematological Investigations in South India. Part II. The Effect of the Administration of Iron on the Haemoglobin Level in Indian Girls and Young Women.** —*Indian Jl. Med. Res.* 1938. Jan. Vol. 25. No. 3. pp. 753–761. With 1 chart.

In a mission school 24 girls were given iron and 24 acted as controls, the ages varying from 10 to 16 years; the groups were further subdivided into subgroups of 12, one of which was composed of girls who had not menstruated and the other of girls who had. All appeared healthy and there was no history or evidence of recent serious illness, helminthic infection or malaria. The daily intake of total iron per consumption unit was estimated at about 23 mgm. In a women's college two similar groups of 24, one to receive iron and the other to act as control, were also examined. All these subjects had reached puberty and were in good health, the ages ranging from 16 to 22; the total daily intake of iron per consumption unit was calculated to be about 25 mgm. to 30 mgm.

Six grains of ferrous sulphate were given daily for 4 weeks to the 24 girls in the mission school, and a similar dose for 6 weeks to the 24 women in the college; three subjects had mild nausea with the ferrous sulphate which was then replaced by a mixture containing 30 grains Ferri et ammon. citras given twice daily.

Haemoglobin estimations were made by means of the benzidine method described in the previous paper. A rise in haemoglobin was observed after 2 weeks of iron medication. In the first group the initial mean haemoglobin level was 16·35 gm. whereas after iron had been given for four weeks the mean level was 20·34 gm. per 100 cc. blood. In the college the levels before and after the administration of iron for six weeks were respectively 13·69 gm. and 18·44 gm. per 100 cc. blood.

Controls not receiving iron did not show similar increases. It might be argued that a higher haemoglobin content of the blood is advantageous in that it facilitates transport of oxygen and may lead to greater efficiency of tissue metabolism but there were no obvious changes in the girls given iron.

The haemoglobin content was found to have returned to the original level two months after the administration of iron had been discontinued. The initial haemoglobin levels observed in this investigation and the levels attained after iron administration are higher than those recorded by other observers.

No differences were found in the haemoglobin content of the blood of girls who had, and those who had not, attained puberty; or during menstruation or in the inter-menstrual period. *F. Murgatroyd.*

NAPIER (L. Everard) & GUPTA (P. C. Sen). **Sternum Puncture. I. The Findings in Normal Indians.**—*Indian Med. Gaz.* 1938. Jan. Vol. 73. No. 1. pp. 1–7. With 3 figs. & 1 coloured plate.

Puncture is made with a stout needle and stylet just to one side of the mid-line at the level of the 3rd intercostal space after local infiltration down to the periosteum with novocain. The operator feels a loss of resistance as the needle enters the marrow cavity; the depth of puncture may also be controlled by an adjustable guard clamped on the needle about ¼ to ½ an inch from the point. After

removing the stylet 2 cc. [which seems an undesirably large amount] of marrow blood is aspirated by means of a syringe, during which the patient feels a dragging pain. Finally the skin puncture is sealed with collodion.

The findings in 10 normal male Indians are summarized, and discussed in relation to the bone marrow cytology according to different observers. [These observers' figures are summarized in a table in which presumably the majority of the figures represent percentages although no indication is given.] *F. Murgatroyd.*

NAPIER (L. Everard) & BILLIMORIA (H. S.). **Haematological Studies in Indians. Part VIII. Analysis of the Haematological Findings in 52 Cases of Anaemia amongst Pregnant Tea-Garden Coolie Women.** —*Indian. Jl. Med. Res.* 1937. Oct. Vol. 25. No. 2. pp. 529–545. With 1 chart.

Haematological records were made of 60 "normal" (that is not obviously anaemic) coolie women. Of these, 40 were pregnant, but no significant difference was obtained between the non-pregnant and pregnant.

The authors then examined a series of 52 anaemic pregnant women and drew the following conclusions :—

"The anaemia in these pregnant women is of two main types ; one is a hypochromic microcytic anaemia caused mainly by hookworm infection though possibly exaggerated by other factors including pregnancy, the other is a hyperchromic macrocytic anaemia in which the pregnancy itself appears to be an important causative factor and which is associated with splenic enlargement but not with hookworm infection.

"There is also a group of cases in which the haemoglobin is almost within the normal range but in which the size of the cells is large ; this type is apparently aetiologically similar to the severe type of macrocytic anaemia and is associated with the pregnancy, but it may be looked upon as an almost physiological anaemia of pregnancy. Finally, there is a small group of cases of a normocytic anaemia of a moderate degree of severity which differs from each of the other two types in some particulars and which is possibly a combination of the two types." *F. Murgatroyd.*

BASU (Charu Chandra) & CHATTERJEE (Hemendra Nath). **Studies on the Normal Haematology of Women Living in Bengal.**—*Jl. Indian Med. Assoc.* 1937. Oct. & Nov. Vol. 7. Nos. 1 & 2. pp. 1–7 ; 61–66. With 3 figs. [41 refs.]

In studying the normal haematology of Bengal the authors examined only those persons who were performing their normal avocations of life without any discomfort and who were not suffering from any visible ailment. Two series were examined. One was an unselected group of 80 women belonging to various races—Bengalese, Hindustanis, Punjabis, and Marwaris living in various parts of Calcutta, the age varying from 16 to 55 years ; several of these exhibited sub-normal figures. The other was a group of 56 selected and healthy young Bengalese girls living in the southern part of the city, their ages varying from 16 to 23 years. For comparison the available figures for normal males, obtained in the same country by Basu and Chatterjee (1934) and by NAPIER and DAS GUPTA (1935) (see this *Bulletin*, 1936, Vol. 33, p. 75) are also given.

In Part I the authors record the results of their examinations of the erythrocytes and the haemoglobin. The average figures for the two series were, respectively, red cells 3·6 and 3·9 millions per cmm., haemoglobin 13·4 and 13·5 gm. per 100 cc., and corpuscular volume 32 and 36 per cent. The sedimentation rate, the percentage of reticulocytes and the corpuscular dimensions were also determined.

In Part II the figures for the white cell counts are recorded.

The average leucocyte counts for the two series were 7,200 and 6,908 per cmm. respectively.

The classification of SCHILLING was followed for the differential count and the majority, or 78 per cent., of the apparently normal females showed a greater percentage of immature polymorphs than the normal European figure. The authors were led to the conclusion that for Bengal women the polynuclear blood picture may be regarded as normal when the relative proportions of mature to immature polymorphs is 3 : 1 or greater.

More than half of the total cases had an eosinophilia greater than 6 per cent., and in the first series the average eosinophilia was 9·6 per cent.

Seventeen cases showed a relative lymphocytosis of 40 per cent. or more. In some instances this was associated with a leucopaenia and since the authors feel that the absence of fever, of splenomegaly, of mononucleosis and of any shift to the left of the neutrophils precludes kala-azar, they ask whether such blood pictures signify a pre-tubercular stage. [" Pre-tubercular " presumably means incipient infection.]

F. Murgatroyd.

NAVARRO (Regino J.). **Hematology in Filipinos. II. Normal Mean Corpuscular Volume, Mean Corpuscular Hemoglobin and Mean Corpuscular Hemoglobin Concentration; the Various Normal Blood Indexes.**—*Jl. Philippine Islands Med. Assoc.* 1937. Oct. Vol. 17. No. 10. pp. 611–620. [16 refs.]

Examinations were made of 138 samples of oxalated venous blood obtained from 135 healthy Filipino adult males and females.

The haemoglobin value of each sample was derived from a determination of its iron content, while the volume of packed cells per 100 cc. blood and the red cell count per cmm. were determined by the usual methods. The averages of these absolute values were for men and women respectively :—haemoglobin 14·11 gm. and 12·61 gm. per 100 cc. ; volume of cells 43 per cent. and 38 per cent. ; and the cell count 5,160,000 and 4,530,000 per cmm. From these determinations were calculated the mean corpuscular volume, the mean corpuscular haemoglobin and the mean corpuscular haemoglobin concentration, and the limiting values were also expressed as indices representing fractions of the respective means.

The various figures are compared with those obtained by different American workers and, after applying shrinkage corrections, volumes of packed cells show close agreement ; but wider differences, for which variations in technical procedures are probably partly responsible, were found for the mean corpuscular volumes. On the other hand, geographical and racial factors were thought to play a greater part than technical procedures in the differences between the haemoglobin contents and concentrations of the various series [see this *Bulletin*, 1938, Vol. 35, p. 82].

F. Murgatroyd.

KENNEDY (Walter P.). **The Leucocyte Picture in Iraq.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1937. Nov. 30. Vol. 31. No. 3. pp. 309–332. With 1 fig. [48 refs.]

The differential leucocyte count and the polynuclear index of 400 carefully controlled healthy persons in Iraq were compared with standard text-book figures for temperate climates. It was found that the percentage of neutrophils was lower and the percentages of eosinophils, lymphocytes and monocytes were higher in the Iraq group, the mean figures for this group being approximately polymorphs 57, eosinophils 4, lymphocytes 26, monocytes 13 per cent., and the polynuclear index 1·86.

The ranges of normal variation were also much wider than those given in the available text-books. The incidence of so-called abnormal cells was also greater and this was taken to be evidence of irritability or greater activity of the haemopoietic system, a contention supported by the deviation of the polynuclear index. In the absence of other obvious factors it was concluded that the likeliest agent which might be responsible for the alteration of the blood picture was climate.

In malaria, tuberculosis, leprosy, phlebotomus fever, and bilharziasis the blood picture differed significantly from the control group and the polynuclear index, compared with that of the normal group, showed a shift to the left.

Embracing all stages of malaria a typical blood picture could not be defined but it was possible to say that, for Iraq at least, monocytosis could not be taken as a diagnostic character of that disease.

Considerable differences, depending perhaps on the stage and extent of the lesions, were found in the differential counts of tuberculous cases. The ranges of variations seemed greater than those of similar cases in Britain, and the polynuclear count, compared with a British group of tuberculous patients, was significantly deviated to the left.

In cases of leprosy relative lymphocytosis was characteristic and in this group basophils were commoner than in other groups.

In phlebotomus fever there was a neutropenia and monocytosis, while a striking character was the large proportion of cells which showed degenerative changes. There was an exceedingly low polynuclear index, the deviation to the left being greater in this than in any other group.

The characteristic reaction in bilharziasis was an eosinophilia, the mean reaching 26 per cent., which, in the absence of any marked leucocytosis, appeared to be at the expense of the other cells. The neutrophils were diminished and the index deviated significantly to the left but less so than in any of the other groups.

F. Murgatroyd.

CARDOZO (W. Warrick). **Immunologic Studies of Sickle Cell Anemia.**—*Arch. Intern. Med.* 1937. Oct. Vol. 60. No. 4. pp. 623–653. With 6 figs. [61 refs.]

A total of 1,570 patients in Chicago was tested for sickling of the red blood cells, the first 800 by means of the well-known cover-glass and slide method only, and the remainder, in addition, by the Beck and Hertz method, in which the shape assumed by the cells after standing in equal parts of physiological saline and 3 per cent. sodium citrate solution under paraffin is fixed by formaldehyde.

Of 1,263 negroes 119 (9·42 per cent.) showed sickling but of 307 non-negroes only 1 (0·32 per cent.). The total incidence of patients showing the sickling phenomenon is higher in this series than in any previously reported, but the number of patients examined was also larger. Furthermore, 16 families accounted for 41 patients and the inheritance of the sickling phenomenon, which is recognized to follow Mendelian law, is well brought out in the series.

It is noteworthy that those whose cells showed sickling were not necessarily anaemic. In fact the majority had normal erythrocyte counts, normal haemoglobin values and no reticulocytosis or evidence of blood destruction at the time of testing; but it is generally believed that patients with this condition, termed "sicklaemia" or latent sickle cell anaemia, are potentially anaemic although the factor causing this regression is unknown. Similarly, it is believed that a patient who is in the anaemic phase may revert to the non-anaemic phase.

In 1,560 cases the blood group was determined; there was no marked tendency for the patients who showed sickling to be concentrated in any one blood group. The distribution of the immune agglutinogens M and N was determined for 306 non-negroes, 209 normal negroes and 63 patients who showed sickling, but no significant differences were observed.

An attempt to demonstrate a specific immune agglutinogen in those patients who showed sickling failed.

The anomalous isohaemo-agglutinogens found by another investigator in patients who showed sickling were not found in this series by cross-matching the cells and sera of patients who were known to show sickling against the cells and sera of the normal persons of both races.

A number of experiments in which freshly-drawn and washed cells were suspended in saline confirmed the view that the sickling factor is inherent within the cell and that the presence of serum is unnecessary for the demonstration of the phenomenon, which also occurred when the cells were suspended in normal plasma or serum. Conversely, inactivated sera from cases showing sickling produced no sickling when added to suspensions of normal erythrocytes. It was also shown that the sickling factor remained associated with the cell, no matter how long preserved, as long as the cell itself remained intact. Further tests showed that agglutination of the cells produced no apparent alteration in the sickling factor associated with them.

An analysis of the entire series of 120 patients who showed sickling was made but revealed little of note except that 69 per cent. were females and 31 per cent. males. On the basis of colour the series comprised 44 black persons, 60 mulattoes, 5 quadroons, and 1 octoroon. [This accounts for only 110.] *F. Murgatroyd.*

HEGNER (Robert). **Parasite Reactions to Host Modifications.**—*Jl. Parasitology.* 1937. Feb. Vol. 23. No. 1. pp. 1–12.

In this interesting address the author reviews certain experiments which have been carried out in his laboratory designed to test the effect of changes in environment on certain intestinal and blood-inhabiting protozoa. It has been shown that a carbohydrate diet renders the intestine of certain animals more favourable to the growth of the intestinal protozoa with which they may be naturally infected

and that it is possible to infect the rat with *Balantidium coli* of the pig if the rat is fed on a high carbohydrate diet. By reducing the proportion of carbohydrate in the food the intensity of protozoal infections is correspondingly reduced. Examination of the caecal contents of pigs has shown that the degree of infection with *Bal. coli* is in direct proportion to the quantity of carbohydrate present. It was also observed that in artificial culture media the ciliates devoured starch grains with extraordinary avidity. An attempt was made to correlate the human intestinal protozoal infections with the quantity of faecal starch, but so far discordant results have been obtained. Certain experiments are recorded in which the intestinal infections of termites were altered or abolished by exposure to high temperatures, with a resulting change in the capacity of these insects to digest wood. In the case of bird malaria it is found that the parasite is favoured by an increase in blood sugar, as also by exposure of the bird to increase in temperature and relative humidity, while alterations in the normal period of light and darkness bring about changes in the cycle of the parasite. A practical issue of these experiments is that a high proteid diet may be of use in combating the ill effects of certain intestinal infections. *C. M. Wenyon.*

D'Antoni (Joseph S.). **Standardization of the Iodine Stain for Wet Preparations of Intestinal Protozoa.**—*Amer. Jl. Trop. Med.* 1937. Jan. Vol. 17. No. 1. pp. 79–84.

In order to obtain uniform results in the use of iodine solutions for the study of intestinal protozoa the author advocates the use of a standard iodine solution, which is prepared by adding 1·5 gm. of powdered iodine crystals to 100 cc. of a 1 per cent. standardized potassium iodine solution. The solution is filtered after standing for four days. A number of details regarding the method of standardizing the solution are given. *C. M. W.*

Gonzalez (Gustavo) & Rivarola (Juan B.). Coloración vital en protozoología intestinal (Rojo Neutro). [**Vital Staining of Intestinal Protozoa with Neutral Red.**]—*9a Reunión Soc. Argentina Patol. Regional, Mendoza, 1, 2, 3 y 4 octubre 1935.* Vol. 2. pp. 772–775.

In this paper the authors describe the appearance of the common intestinal protozoa of man when exposed to 1/2,000 neutral red solution —vital staining. *C. M. W.*

Gauducheau (A.). A propos de la phagocytose amibienne. (2e note.) [**Amoebic Phagocytosis.**]—*Bull. Soc. Path. Exot.* 1936. Dec. 9. Vol. 29. No. 10. pp. 1069–1074. With 4 figs.

The paper describes the phagocytosis and process of digestion by a culturable free-living amoeba (*Amoeba phagocytoides*) of *Bacillus coli*. The amoeba is not able to ingest and destroy staphylococci except in the presence of *Bact. coli*. Furthermore, if tubercle bacilli are injected into a guineapig along with *Bact. coli* it appears that the phagocytes are then able to deal with the tubercle bacilli to some extent, so that only a localized lesion is produced. *C. M. W.*

FOURNIER (J.). Présence de lamblies dans la bile provoquée après cholécystectomie. [**Lamblia in the Bile after Cholecystectomy.**]—*Bull. Soc. Path. Exot.* 1937. June 9. Vol. 30. No. 6. pp. 476–478.

The author describes a case in which he discovered Lamblia in the fluid from the duodenum after cholecystectomy had been performed. The flagellates were most numerous in the third sample of fluid withdrawn and it is presumed that the flagellates had been washed from the bile ducts. In discussion DESCHIENS, whose experience with this kind of evidence entitles him to speak with authority, points out that rarely if ever has anyone found Lamblia by direct observation in the gall bladder or bile ducts of cases which were known to harbour the flagellates in the intestine and which had subsequently been operated upon or had been examined post-mortem. He considers that a duodenal infection may cause a secondary or reflex hepatic symptomatology.

C. M. W.

DREYFUS (Jules R.). Lambliogener Addisonismus. [**Addison's Disease due to Lamblia.**]—*Wien. Klin. Woch.* 1937. Aug. 6. Vol. 50. No. 31. pp. 1153–1155. With 1 chart. [12 refs.]

A patient showing symptoms of Addison's disease was found to have a very heavy lamblia infection of the duodenum. It is concluded that a toxin generated by the lamblia had acted adversely on the suprarenals. This conclusion is supported by lengthy arguments which can only be followed by reading the paper in detail.

C. M. W.

HEGNER (Robert) & ESKRIDGE (Lydia). **Persistence in Rats of Human Intestinal Trichomonad Flagellates.**—*Amer. Jl. Hyg.* 1937. July. Vol. 26. No. 1. pp. 124–126.

—— & ——. **The Influence of Bile Salts on Giardia Infections in Rats.**—*Ibid.* pp. 124–134. [2 refs.]

Having available a colony of trichomonas-free rats, the authors tested the susceptibility of a number of these animals to human trichomonads by administering cultures by the mouth. It was found that infection occurred even after a single dose and that this was maintained for long periods, in one case for over a year. It would appear, therefore, that rats in nature may become carriers of human trichomonads and thus be sources of infection for man.

In the second paper it is stated that feeding experiments show that a diet of liver is very favourable to the growth and persistence of human trichomonads in the caecum of rats, as tested by killing the rats and estimating the number of these flagellates in the caecum.

C. M. W.

DE MURO (P.). Trichomoniasi intestinale a sindrome d'enterocolite muco-membranosa. [*Trichomonas intestinalis* **as a Cause of Mucomembranous Colitis.**]—*Policlinico.* Sez. Med. 1937. Sept. 1. Vol. 44. No. 9. pp. 425–440. [115 refs.]

This is a very long paper on the subject of the pathogenicity of *Trichomonas hominis*, which it is concluded can give rise to three forms

of muco-membranous entero-colitis—simple, febrile and cachectic. Treatment recommended is the oral administration of yatren and enterovioform. The paper concludes with an extensive bibliography.

C. M. W.

Jerace (Felice). Un caso di enterite da " Spirochaeta intestinalis " associato con " Trichomonas intestinalis." [**Spirochaetal Enteritis Associated with Trichomonas.**]—*Giorn. Ital. di Clin. Trop.* 1937. Sept. 30. Vol. 1. N.S. No. 9. pp. 266, 269–70. With 1 fig.

In a case of enteritis both spirochaetes and trichomonas were present in the faeces. It is concluded that these organisms are responsible for the condition. *C. M. W.*

Paulson (Moses). **The Numerical Determination of *Trichomonas hominis* in Urine and its Practical Implications in Genitourinary Parasitism.**—*Jl. Lab. & Clin. Med.* 1937. Mar. Vol. 22. No. 6. pp. 646–650.

The author has demonstrated that an estimation of the number of trichomonas present in cases of urinary infection can be made by counting in the haemocytometer, after the flagellates have been immobilized by the addition of a couple of drops of one per cent. solution of formalin to 5 cc. of urine. *C. M. W.*

Bland (P. Brooke) & Rakoff (A. E.). **The Incidence of Trichomonads in the Vagina, Mouth and Rectum. Evidence that Vaginal Trichomonads do not originate in the Mouth or Intestine.**—*Jl. Amer. Med. Assoc.* 1937. June 12. Vol. 108. No. 24. pp. 2013–2016. [27 refs.]

The authors studied the infection rate of trichomonas amongst 200 women at an ante- and post-natal clinic. All available methods (direct examination, film staining, culture) were applied to determine the presence of flagellates in the mouth, intestine and vagina. A vaginal infection was present in 23·5 per cent., a buccal infection in 16·5 per cent. and an intestinal infection in 1·5 per cent. From the figures obtained it did not seem probable that these infections were of the same type and that vaginal infections were of intestinal or buccal origin or that intestinal infection had followed a buccal infection. It appeared that *T. vaginalis*, which was not cultivable at room temperature as were the other forms, was physiologically distinct.

C. M. W.

Simitch (T.) & Kostitch (D.). Rôle de la mouche domestique dans la propagation du *Trichomonas intestinalis* chez l'homme. [**Rôle of the House Fly in Spread of *T. intestinalis* in Man.**]—*Ann. Parasit. Humaine et Comparée.* 1937. July 1. Vol. 15. No. 4. pp. 323–325.

In a series of experiments in which house flies were allowed to feed on cultures of trichomonas and then on fluids which were transferred to culture media it was demonstrated that the flies were capable of contaminating these liquids with living flagellates. The conclusion is that house flies are responsible for the spread of the human trichomonas.

C. M. W.

CORRADETTI (Augusto). I distomi parassiti dell'*Anopheles maculipennis*. [**Distomes Parasitic in** *Anopheles maculipennis*.]—*Riv. di Parassit.* Rome. 1937. Jan. Vol. 1. No. 1. pp. 39–51. With 2 text figs. & 12 figs. on 2 plates. [14 refs.] English summary (4 lines).

During the dissection of anopheles various observers have encountered in the abdomen and thorax encysted distome trematodes which have been placed in the genus *Agamodistomum*. They have been found in *A. maculipennis* in Europe as well as in anopheles in India. The author discusses the literature on the subject and comes to the conclusion that there are four species, three in Europe and one in India. One species, *Agamodistomum neurogangliorum*, is a new species from Italy. *C. M. W.*

IVANIĆ (Momčilo). Ueber einen Protoplasmakörperparasiten von *Entamoeba histolytica* Schaudinn (*Entamoebophaga hominis* gen. nov. spec. nov.). [**An Intracellular Parasite of** *E. histolytica*.]—*Zent. f. Bakt.* I. Abt. Orig. 1936. Dec. 10. Vol. 138. No. 1/2. pp. 48–56. With 38 figs. on 1 double plate.

The author was examining certain iron-haematoxylin-stained preparations he had made of *E. histolytica* in faeces when he noted that within certain of the amoeba was another amoeboid organism. The growth of this was traced from a small uninucleate body to a large multinucleate cytoplasmic mass occupying nearly the whole of the interior of the amoeba. In the surrounding medium were also free forms of this organism, large plasmodial masses and cysts containing four or more products of division. The organism, which is allied to the Mycetozoa, is given the name *Entamoebophaga hominis*, n.g. n.sp. The appearances of the new parasite are shown in a plate of 38 figures. It is evident that this organism, which has been seen by no other worker, requires further investigation. *C. M. W.*

NEWIADOMSKI (M. M.). Blastozystentumoren. [**Blastocystis Tumours.**]—*Zent. f. Bakt.* I. Abt. Orig. 1937. Jan. 15. Vol. 138. No. 3/4. pp. 244–249. With 5 figs.

The paper describes the occurrence of ultramicroscopic stages of development in cultures of *Blastocystis*. These are said to pass a Seitz or Chamberland (L_2) filter and to yield, in the course of a month or so in fresh medium, cultures of typical *Blastocystis*. From cultures of the organism enclosed in collodion sacks inserted in the subcutaneous tissues of rats, the ultramicroscopic forms pass into the tissues and become transformed into cells which resemble cells of the tissues of the animals. They give rise to tumours consisting of atypical polymorphic cells. *C. M. W.*

CABRERA CALDERÍN (César). El *Blastocystis hominis* como parasito patogeno del hombre. [*Blastocystis hominis* **Pathogenic for Man.**]—*Rev. Med. Trop. y Parasit.* Habana. 1937. May–June. Vol. 3. No. 3. pp. 207–213.

The paper is a lengthy argument in favour of regarding *Blastocystis hominis* as pathogenic and responsible not only for local intestinal symptoms but also for others of a more general character, such as debility, anaemia and urticaria. *C. M. W.*

Public Health Reports. 1937. Mar. 19. Vol. 52. No. 12. pp. 334–336.—**Coccidioidal Granuloma.**

Coccidioidal granuloma, a disease due to a fungus, *Coccidioides immitis*, attacks the pulmonary, osseous, cerebrospinal and cutaneous systems in the order mentioned. Other tissues of the body, with the exception of the gastro-intestinal tract, may also be affected. Cutaneous lesions may be primary (papules, nodules, pustules, vegetating papillomas, verrucous lesions) or secondary (subcutaneous nodules, tumours, abscesses, ulcers). The disease occurs in both man and animals and is specially prevalent in central and southern California. Up to July 1st, 1936, 450 cases had been noted in California, with 224 deaths. There appears to be no case to case infection and the theory that the disease is soil-borne is probably correct. The parasite is a double contoured organism with a refractile capsule. Reproduction is by endogenous spore formation. *C. M. W.*

Dickson (Ernest C.). **Coccidioides Infection. Part I.**—*Arch. Intern. Med.* 1937. June. Vol. 59. No. 6. pp. 1029–1044. With 4 figs. [17 refs.]

The author points out that the disease coccidioidal granuloma is really the advanced or terminal stage of an infection which has rarely been recognized in the acute stage. Inhalation of the spores of the causative fungus may be followed by broncho-pneumonia and erythema nodosum. The paper gives an account of culture of the fungus and the various forms it assumes. *C. M. W.*

Krajian (Aram A.). **A Rapid and Economical Method for staining Routine Tissue Sections with Hematoxylin and Eosin.**—*Arch. Pathology.* 1938. Mar. Vol. 25. No. 3. pp. 376–377.

The following will be of interest to pathologists in the tropics where the saving of alcohol in laboratory procedure is important.

The most difficult stage in the time-honoured method of tissue staining with haematoxylin and eosin is the counter-staining and subsequent dehydration, because of reduction of the degree of eosin staining in the succeeding steps of the procedure. The modification proposed consists in carrying out the dehydration before counter-staining with eosin dissolved in carbolxylene, "eosinol." There is no decolorization by the subsequent treatment of the section. Details of the preparation of the stain and of the method of procedure are given by the author as follows :—

Preparation of Eosinol.

"Dissolve 5 gm. of aqueous eosin in 10 cc. of distilled water. Precipitate it by adding 10 cc. of glacial acetic acid and mix with a glass rod. Incubate the resulting coagulum at 56°C. for from twelve to sixteen hours, or until all the water has evaporated.

"Dissolve this dehydrated acid-eosin in 10 cc. of absolute alcohol and 20 cc. of acetone, stirring with a glass rod for several minutes. Let the undissolved portion, which is to be discarded, settle to the bottom of the container (about ten minutes). Remove the clear portion with a clean dry pipet ; add it to 1,500 cc. of carbolxylene (1 part pure phenol crystals in 3 parts of neutral xylene). Some precipitate will form, which will settle to the bottom of the container. The clear portion is eosinol. The solution keeps indefinitely.

" Owing to variation in the staining power of the various brands of powdered eosin, it may be necessary to standardize the solution by staining control sections and adjusting the strength of the eosinol by reducing or increasing the amount of carbolxylene.

Staining Method.

" 1. Prepare microscopic sections by one of the standard sectioning methods (*i.e.*, employing frozen tissue or tissue embedded in paraffin or pyroxylin) and stain in alum-hematoxylin (Harris ; Delafield) for from three to seven minutes.

" 2. Wash in tap water until blue (about thirty seconds).

" 3. Destain in acid-alcohol (1 cc. of concentrated hydrochloric acid in 99 cc. of 70 per cent. alcohol) by dipping the section in and out for even destaining.

" 4. Rinse in tap water.

" 5. Blue by dipping in 2 per cent. ammonia water (2 cc. of strong ammonium hydrate in 98 cc. of tap water).

" 6. Wash in tap water for a few seconds.

" 7. Wipe off the water with a towel, dehydrate in 95 per cent. alcohol for one minute and wipe off the back of the slide.

" 8. Dehydrate completely by pouring on a few drops of absolute alcohol from a drop bottle. Repeat.

" 9. Counterstain and partially clear in eosinol for from ten to thirty seconds, depending on the strength of the solution.

" 10. Treat with carbolxylene for three minutes.

" 11. Treat with first xylene two minutes.

" 12. Treat with second xylene two minutes.

" 13. Treat with third xylene two minutes.

" 14. Mount in gum dammar (saturated solution of gum dammar in neutral histologic xylene.)"

H. H. S.

MEDICAL AND SANITARY REPORTS.

BRITISH MALAYA.

Introductory.—The year 1936 saw published for the first time under one cover the Annual Medical Reports for the Straits Settlements and the Federated Malay States, this action constituting the first step towards a Pan-Malayan Medical Report, for the time is not yet ripe for the inclusion of the Reports of the Non-Federated Malay States. The Report under review contains a series of admirable illustrations of phases of medical life and work in Malaya.

The reader may be reminded that in 1932 the staffs of the Straits Settlements and Federated Malay States Medical Services were amalgamated to form the Malayan Medical Service under the Director-Adviser (see this *Bulletin* 1934, Supp., p. 123* and 1935, Supp., p. 145*). Officers of the Medical Service are liable to serve either in the Straits Settlements or in the Federated Malay States. In order to facilitate reference to corresponding summaries published in previous issues of this *Supplement*, it is proposed to follow former practice by discussing the respective areas separately as hereafter.

FEDERATED MALAY STATES (1936).

The Federated Malay States are situated on the mainland of the Malay Peninsula, closely connected with the Straits Settlements. They comprise four States : Perak, Selangor, Negri Sembilan and Pahang. The total area is 27,648 sq. miles. The principal towns are Ipoh, Taiping, Kampar and Teluk Anson in Perak, Kuala Lumpur and Klang in Selangor, and Seremban in Negri Sembilan.

Vital Statistics.—The mid-year population estimated by the balancing equation method was 1,847,951 : it is stated that the excess of immigration over emigration had considerably less influence on vital statistics during the period under review. The racial distribution of the population reads as follows :—

State	Malays	Chinese	Indians	Non-Asiatics	Others	Totals
Perak... ...	334,683	347,151	168,768	3,032	6,459	830,093
Selangor ...	137,116	260,256	164,842	3,594	9,967	575,775
N. Sembilan ...	96,402	97,750	51,481	1,065	3,155	249,853
Pahang ...	119,456	55,920	14,989	474	1,391	192,230
Totals ...	687,657	761,077	400,080	8,165	20,972	1,847,951

Registered Births numbered 71,504 giving a crude birth-rate of 38·7 per 1,000 persons. The increase in the birth-rate is shared by all races but is most marked for Malays, the rates reading, Malays 43·4, Chinese 38·5, Indians 33·3, Non-Asiatics 14·9, and " Others " 9·1 respectively.

Registered deaths numbered 35,528 with a crude death-rate of 19·2 per mille. The distribution of death-rates by race shows that the highest rate, 21·5 per 1,000, occurs among Malays, then in descending order appear Chinese 18·5, Indians 18·0, " Others " 5·6, and Non-Asiatics 3·4.

The Infant Mortality Rate shows a further decline from 144 per 1,000 births in 1935 to 142 per 1,000 in 1936. The improvement in Infant Mortality among Malays in Perak during 1935 was not maintained, for during 1936 the rate rose to 162 per mille, a localized rise which cannot be explained, for a decrease is recorded for Malays in all other States. Chinese in Perak record the lowest rate of 123 per 1,000, and are followed by Indians in Selangor, and Malays in Negri Sembilan each with a rate of 129 per 1,000 births.

The numbers of *labourers on estates* were less than in previous years, *viz.* 159,431 : the distribution of the labour force by States and the corresponding deaths and death-rates are set out in the following Table :—

State	Labour Force	Deaths	Death Rates
Perak ...	51,713	347	6·7
Selangor ...	57,716	351	6·1
N. Sembilan ...	37,290	298	8·0
Pahang ...	12,712	114	9·0
Totals ...	159,431	1,110	7·0

Maternity and Child Welfare Work.—At all Government Hospitals, provision is made for dealing with maternity cases. Maternity Wards are reserved for Malay women at the General Hospital, Kuala Lumpur, and there are also Maternity hospitals supported by the Chinese Communities in Selangor, Perak, and Negri Sembilan. Official Returns record 8,836 cases treated for conditions associated with pregnancy, childbirth, and the puerperal state, and of these 7,146 were normal labour cases. *The Training of Midwives* was continued in all the four States ; at Government Hospitals the majority of trainees are Malays, with Chinese at the Chinese Maternity Hospitals. The successful candidates are posted to selected kampongs where infant mortality is highest ; it is stated that trained midwives are gradually eliminating the untrained *bidans* throughout the States, but there is urgent need for better midwifery amongst the Tamil population.

There are 16 *Infant Welfare Centres* distributed as to 3 in Perak, 9 in Selangor, one in Negri Sembilan, and 3 in Pahang ; these centres are controlled either by a Lady Medical Officer or by a Health Sister with Health Visitors and trained midwives (see this *Bulletin* 1937, Supp., p. 156*). Custom and prejudice are gradually being overcome and Malay women are attending the Clinics in increasing numbers.

School Hygiene.—Schools are regularly visited by Health Officers, Lady Medical Officers, and Health Inspectors, and pupils medically examined. During the year under review 1,301 visits were paid to 685 schools, 57,214 children were examined, and the principal findings expressed as percentages of total defects noted recorded as follows :—

Defect	Perak	Selangor	N. Sembilan	Pahang
Dental diseases	26·0	33·59	63·75	47·35
Skin disease	5·3	7·06	16·36	10·66
Eye defects...	0·2	1·28	2·68	2·53
Spleen enlargements ...	5·6	12·7	11·99	9·71
Pediculosis	2·9	7·28	12·56	2·17

Hygiene is taught in all schools and teachers are required to pay particular attention to the health and cleanliness of their pupils.

The Senior Dental Surgeon treats children of school and pre-school age at his Kuala Lumpur clinic, and also visits children in schools and kampongs in rural areas. Towards the end of the year an additional Dental Officer was appointed in Perak.

Public Health, Sanitation, etc.—It is said the general health of the community during 1936 showed no unusual features; no new constructional works of any magnitude were undertaken.

There is nothing new to record with regard to the methods of *sewage disposal* (see this *Bulletin*, 1936, Supp., p. 153*) except perhaps to add that in suitable localities, particularly in villages, every opportunity has been taken to extend the effective method of sewage disposal by the use of tube latrines. Water supplies are generally satisfactory; bacteriological and chemical tests show a high standard of purity, though again it is noted that the purity of the water at Pekan is below standard (see this *Bulletin* 1937, Supp., p. 157*). A new purification plant was brought into use at Kuala Pilah, Negri Sembilan in May and and has proved very satisfactory.

Housing and Town Planning matters receive close attention and the work of demolition of insanitary dwellings and slum clearance was continued in the large towns. Routine house-to-house inspections are carried out regularly in all Sanitary Board areas, and progress is reported in dealing with overcrowded areas, ventilation, and general sanitation.

Estates and Mines were regularly visited by Officers of the Health Branch usually with the willing co-operation of estate and mine authorities who realize the economic value of improved health conditions on their properties. The death rate of labourers showed a slight increase, but this is attributed to some extent to the low powers of resistance possessed by new immigrants (see above *Vital Statistics*). Health Officers continued their visits and supervision of labourers in the employ of Government; the general health of these was reported to be satisfactory. *The Railway Health Officer* and his staff are responsible for health conditions of the F.M.S. Railway, and for the medical treatment of all railway employees; during the year 28,676 patients were dealt with.

The close supervision of Health Officers of *restaurants, food factories, bakeries*, etc., continued to be exercised. Though all *dairies* and *milk sellers* are licensed, adulteration is frequently practised, and it is stated that on the whole the conditions under which milk is supplied are still unsatisfactory.

The measures taken to spread knowledge of hygiene and sanitation remain as described in these pages a year ago. Health education films attract good audiences and the policy of Health Inspectors visiting and lecturing in kampongs is achieving success.

The training of Sanitary Personnel was continued at Singapore (see this *Bulletin* 1937, Supp., p. 158*). Three candidates were sent from Perak to take the course, three appeared for re-examination and two were successful. In Selangor two probationary sanitary inspectors are under training prior to taking the course at Singapore.

The various *legislative measures* enacted during the year in the interest of public health dealt with such matters as Sanitary Boards, Mental Diseases, Quarantine, Medical Registration, and Deleterious Drugs.

Port Health Work.—Ocean-going vessels entering and clearing from Port Swettenham during 1936 numbered 2,053 and there were also 920 other vessels dealt with, exclusive of native craft. The Port Health Officer examined 36,506 passengers and 12,439 members of crews; 30 immigrant vessels arrived from infected ports, all immigrants on board being quarantined for a scheduled period. Eight pilgrim ships passed through the port but no pilgrims embarked or landed. The examination of immigrants for signs of leprosy was continued and among 8,482 persons examined 46 cases of leprosy were discovered and 39 patients repatriated. Immigrants are also examined for signs of recent vaccination, and where such signs are absent are revaccinated: 1,973 vaccinations were performed under this regulation.

Hospitals, Dispensaries, etc.—An increase in the number of admissions to hospitals is recorded, *viz.*, 98,551 as compared with 92,353 in the preceding year; the racial distribution of patients reads: Chinese 33,621 with 4,072 deaths, Indians 52,731 with 2,870 deaths, Malays 9,807 with 219 deaths, and "Others" 2,392 cases and 100 deaths. In-patients and out-patients treated at Hospitals, Dispensaries, etc., in the four States, were as follows:—

State	Hospitals	Beds	Admissions	Deaths	Out-patients
Perak	15	2,312	43,308	3,337	269,171
Selangor ...	7	1,475	25,846	1,917	219,129
N. Sembilan ...	6	966	15,780	1,194	105,795
Pahang ...	7	685	13,617	813	120,465
Totals ...	35	5,438	98,551	7,261	714,560

Of the total out-patients treated 232,111 were dealt with at *Stationary Dispensaries* and 203,247 by *Travelling Dispensaries*, the number and distribution of these out-patient treatment centres being:—

Item	Perak	Selangor	N. Sembilan	Pahang
Rural Dispensaries	19	12	4	8
Travelling Dispensaries (Motor)	8	4	5	4
Travelling Dispensaries (River Motor Boats)	2	—	—	1

The prevailing diseases amongst in-patients were *malaria, respiratory affections, venereal diseases*; the notes which follow summarize the textual commentaries contained in the Report under review.

Though *malaria* figures remain high, both incidence and mortality are lower than in the preceding year. Hospital admissions for this cause totalled 20,344 and of these diagnosis was confirmed by microscopic blood examinations in 15,317 cases, the findings being *subtertian infections* 64·6 per cent., *benign tertian* 28·7, *quartan* 2·3 and *mixed infections* 4·4 per cent. Deaths ascribed to *malaria* numbered 915 and to *undefined fevers* 12,456; hospital deaths due to malaria numbered 627; there were also 12 cases of *blackwater fever* with 3 deaths.

Among 280,920 blood films examined at hospital laboratories 28,970 were found to contain malaria parasites, 17,271 being *sub-tertian*, 9,958 *benign tertian*, 804 *quartan* and 937 *mixed infections*.

There was an increase of malaria in the coast district of Selangor, the infection being due to *A. sundaicus*. It is reported that anti-malaria measures in the rural areas are hindered by lack of funds, and the continued absence of necessary legislation. Meanwhile the Chairman of the Malaria Advisory Board emphasizes the wastage of man power, financial loss, and misery caused to hundreds of thousands of people due to the disease (see this *Bulletin* 1937, Supp., p. 160*).

At the Institute for Medical Research, the Malaria Research Officer investigated and demonstrated the efficacy of atebrin as a prophylactic and examined the claims of malorein, a drug widely advertised in the near East. Experiments in improving the composition of anti-larval oils were continued.

No case of *cholera* has been reported since 1927 nor of *plague* since 1928. There were no cases of *smallpox* but routine vaccinations were continued, 81,629 vaccinations being performed during the year.

Eleven cases of *cerebrospinal meningitis* with nine deaths were recorded, 8 cases with 6 deaths in Selangor, and 3 fatal cases in Perak. Cases of *tropical typhus* admitted to hospitals numbered 211 and 19 deaths were recorded. At the Institute for Medical Research, after five years of investigation, the Pathologist has proved that the two diseases, rural typhus and Japanese River Fever are identical, the discovery is of no little scientific interest, and reduces the number of typhus-like fevers in Malaya from three to two. Nine cases of *acute poliomyelitis* with one death were reported from Selangor.

Cases of *diphtheria* dealt with in Government Hospitals numbered 140 with 42 deaths, while total deaths due to this cause in the Federated Malay States numbered 48 with 161 notifications of cases of the disease (see this *Bulletin* 1937, Supp., p. 160*). Of the total deaths recorded the State of Selangor again heads the list with 26. Hospital admissions of patients suffering from *influenza* numbered 5,729 and of these 18 died.

Enteric fever is said to occur mainly in the urban areas and so far as can be ascertained is directly connected with hawkers of food. Hospital cases dealt with numbered 328 and of these 309 were admitted during the year; of the total cases 312 were *Bact. typhosum* and 16 *Bact. paratyphosum* infections. At the Institute for Medical Research work begun in 1932 on the enterica group was continued; results of the investigation are expected to be available during 1937.

Under the title of *dysentery* 1,347 cases were treated as in-patients at Government Hospitals and 203 died; there were also 2,130 cases of *diarrhoea and enteritis* with 428 deaths. In the four Federated Malay States deaths due to dysentery and diarrhoea totalled 1,696; it is thought the incidence of the disease is related to recently arrived Indian immigrant labourers, but a variety of factors are involved, none being held solely responsible.

Both the incidence and mortality due to *beriberi* show increases over 1935 experience; hospital admissions numbered 586, cases treated 661, and 66 of these patients died. In the Federated Malay States as a whole there were 339 beriberi deaths, 124 of these occurring in the State of Selangor.

Of *tuberculosis* it is said that though total deaths due to this cause show a slight increase over the record for 1935, and that the great majority of cases reported are town dwellers, no figures of any value are available relating to the incidence of the disease. Hospital cases of *all forms* of tuberculosis numbered 2,466 and 2,241 of these were admitted during the year. Of the total cases treated, with 902 deaths, 2,212 were of the pulmonary form of the disease and in this group 821 deaths were recorded. Cases seeking admission to hospital are usually in an advanced stage of the disease; this is particularly true of the Chinese among whom incidence is high (see this *Bulletin* 1937, Supp., p. 161*). The problem is being dealt with by improving housing, general measures of sanitation, and by education of the poorer classes. During the year 2,808 persons were admitted to hospitals suffering from *pneumonia* and *broncho-pneumonia*, and 1,274 died, while there were also 3,167 admissions for *bronchitis* with 81 deaths.

With regard to *helminthic diseases* all that is said is that they take a heavy toll in disability. Hospital returns show 1,026 in-patient cases of *ankylostomiasis* and 1,362 of *ascariasis*. At the Hospital Laboratories there were examined 177,485 faecal specimens relating to 104,859 patients; positive findings included 10,697 containing ova of ankylostome and 27,263 of ascaris.

Leprosy, a disease now very much a concern to Government, again shows an increase, for the population of 1,830 patients in the Sungei Buloh Settlement at the end of the year is an increase of 237 over the corresponding figures at the end of 1935. Admissions during the year numbered 441 and re-admissions of discharged patients 108; 70 patients died and only 50 were discharged, the small number of the latter being partly ascribed to the fact that the standard of fitness for discharge has been raised considerably (see this *Bulletin* 1937, Supp., pp. 161*–162*). Of the total of 1,830 patients, 1,380 were Chinese and 302 were Indians. Methods of treatment follow along the general lines described in these pages a year ago, the percentages of improvement recorded in various types of leprosy being as follows:—

	C1 Mild cutaneous	C2 Medium severity	C3 Advanced cutaneous	Neuro Macular	Nerve
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Malays	90	22	2	38	21
Indians	68	8	2	47	21
Chinese	78	28	10	38	17

In the course of routine treatment of 230 *tuberculoid* cases by esters it was noted that nearly 75 per cent. showed no appreciable improvement, 20 per cent. were better, and 5 per cent. were worse. It is said results suggest that esters treatment of this type of leprosy may be supplemented with benefit by one of the phthalic acid group. Hydnocarpus derivatives incorporated into an ointment or lotion are described as of especial value in the treatment of spreading leprotic sores, the effects being said to be little short of dramatic.

The Leper Asylum at Kuala Lumpur continues to house chronic incurable lepers who are opium smokers; no additions to the numbers

of inmates were made during the year at the end of which there were 200 patients accommodated.

Venereal diseases.—The number of cases treated at hospitals and clinics continued to decline during 1936 and 17,741 cases were dealt with as compared with 18,422 in the preceding year. The following Table shows the distribution of type of disease in conjunction with racial origin or nationality.

Race, etc.	Syphilis	Gonorrhoea	Soft Chancre	Total
Chinese	4,461	2,565	566	7,592
Tamils	3,009	2,612	821	6,442
Malays	1,444	916	87	2,447
Sikhs	329	317	90	736
Eurasians	59	59	12	130
Europeans	22	32	9	63
Others	178	144	9	331
Totals ...	9,502	6,645	1,594	17,741

To the *Central Mental Hospital* 1,087 patients were admitted, 863 were discharged and 205 died, leaving 2,626 under treatment at the end of 1936. Accurate histories being difficult to come by the causative factors in the majority of cases are not very reliable; syphilis appears from available records to predominate as a cause of mental disease.

Other diseases referred to in the Report include the following. Hospital admissions for *cancer* numbered 510 and there were 175 hospital deaths due to this cause. Eleven cases of *leptospirosis* with five deaths were recorded; Negri Sembilan remained free from the disease cases occurring in the other three of the Federated States. Cases of *anaemia* numbered 1,621; a considerable number of these were probably secondary to, and final stages of, diseases such as malaria and ankylostomiasis.

Scientific.—The results of routine examinations at Hospital Laboratories and of some of the research work carried out at the Institute for Medical Research have already been referred to in the preceding notes. It remains to say that at the Institute for Medical Research other activities included the study of cases of *agranulocytosis* and *glandular fever*, diseases rare in Malaya, while the Entomologist commenced an investigation into the problem of *filariasis* in collaboration with Dr. J. J. C. Buckley of the London School of Hygiene and Tropical Medicine.

Financial.—Total expenditure on Medical Department services amounted to $4,127,957 (£481,595) a sum which represents 6·1 per cent. of the total revenue or 7·8 per cent. of the total expenditure of the Federated Malay States during 1936. In addition the Public Works Department expended $163,243 on new hospital and institutional buildings and $112,287 on maintenance and repair services, etc., while from Sanitary Board and other Government funds a sum of $458,626 was spent on antimalarial works of various kinds. *P. Granville Edge.*

STRAITS SETTLEMENTS (1936).

The Colony of the Straits Settlements, the collective name given to the Crown Colonies formed by the British possessions on or adjacent to the mainland of the Malay Peninsula, as opposed to the Federated and Unfederated Malay States, consist of the island of Singapore with about a score of small islets lying in its immediate vicinity, the town and territory of Malacca, the island of Penang and Province Wellesley, and the island of Labuan. The total area is about 1,357 square miles (Singapore, 220 square miles; Penang and Province Wellesley, 400 square miles; Malacca, 640 square miles), and Labuan, 35 square miles.

Introductory.—The reader is referred to p. 461 *supra* where mention has been made that in 1936 the Annual Reports of the Federated Malay States and Straits Settlements appeared for the first time under one cover.

Vital Statistics.—The mid-year population was estimated to be 1,168,197, the local and racial distributions being as follows:—

Item	Singapore	Penang	Province Wellesley	Malacca	Labuan	Total
Europeans	10,452	1,747	284	422	29	12,934
Eurasians	7,437	2,177	288	2,205	43	12,150
Malaysians	69,972	40,781	73,902	104,261	5,130	294,046
Chinese ...	455,191	131,183	48,394	71,239	2,397	708,404
Indians ...	51,740	28,347	24,996	24,085	147	129,315
Others ...	8,371	1,759	541	616	61	11,348
Totals...	603,163	205,994	148,405	202,828	7,807	1,168,197

Registered live births numbered 51,788, giving a crude birth rate of 44·3 per 1,000, the highest rate so far recorded in the Colony. The highest birth rate recorded was that for Chinese in Singapore; it is pointed out that among the Chinese population the proportion of women of child-bearing age has increased steadily since 1931. *Registered deaths* totalled 29,094 and the crude annual death rate 24·9 per 1,000, a slight improvement over the 1935 rate. *The Infant Mortality Rate,* notwithstanding the increased attention devoted to infant welfare activities, rose to 170·9 per 1,000 live births, the rate recorded after correction for children born elsewhere. In an attempt to account for the increased rate it is pointed out that during 1936 women were employed in industry to a greater extent than usual. Infant mortality continues to be highest among Malays in Singapore and Malacca.

Maternity and Child Welfare Work.—During recent years Government has devoted special attention to the provision of maternity and infant welfare services. Maternity wards or beds are available at most of the hospitals (see this *Bulletin* 1937, Supp., p. 165*), and during the year under review the details of work shown in Table on following page were recorded.

Regular courses of training continue to be provided (see this *Bulletin* 1937, Supp., p. 165*). Registered midwives in the Colony numbered, Class A. 326, Class B. 851, and Class C. 341.

Centre	Admissions	Deliveries	Maternal Deaths
Singapore			
General Hospital	1,176	1,014	10
Maternity Hospital, Kandang Kerbau	5,142	4,717	62
St. Andrew's Mission Hospital ...	?	431	?
Kwong Wai Shiu Hospital	?	389	?
Penang			
King Edward VII. Maternity Hospital	2,187	1,996	26
Butterworth Hospital	70	61	2
Bukit Martajam Hospital	63	63	2
Sungei Bakap Hospital	76	59	4
Malacca			
General Hospital	713	596	16
Alor Gajah Hospital	66	47	3
Jasin Hospital	42	40	0

Infant Welfare Centres supervised by Health Officers are placed in charge of Health Sisters to whom are attached Health Nurses, Health Visitors and trained Midwives (see this *Bulletin* 1937, Supp., pp. 165*–166*). There are now 23 Government Infant Welfare Centres and 9 Sub-Centres; attendances at clinics totalled 186,743 and visits to houses 213,152. At the three Singapore Municipal Clinics 17,418 new infants were placed on the registers, attendances numbered 46,888 and 26,062 visits were paid to the homes of 18,304 mothers.

The Women's and Children's Dispensaries conducted by Government in the large towns continued to function with success. During the year 49,089 new patients were dealt with and among them 24,758 children.

School Hygiene.—The arrangements providing for the inspection of schools and schoolchildren in Singapore, Penang, Province Wellesley, and Malacca remain as previously described (see this *Bulletin* 1937, Supp., p. 166*). Below are given the principal facts recorded during the medical inspection of children, but it is necessary to mention that in addition to these details, routine inspections of schools and school premises were made on numerous occasions in all areas for purposes of general school hygiene by Medical Officers and Sanitary Inspectors; in this connexion it may be noted that a number of private or aided Chinese and Tamil schools are at present subject to sanitary supervision, health conditions in such schools are gradually being brought into accordance with the requirements of the *Registration of Schools Ordinance*. The following is a summary statement of the principal findings recorded during the course of medical examinations in various schools :—

Singapore.—Girls' Schools visited 31, pupils examined 8,384, pupils referred for treatment 6,192, principal defects noted—defective vision, etc., 66·3 per cent., dental caries 59·9 per cent., enlarged tonsils 11·3 per cent. Hookworm and round worm common in teachers and pupils of Malay Girls' Schools. *Boys' Schools* visited 46, pupils examined 10,928, principal defects noted—dental caries 30·8 per cent., defective vision, etc., 5·0 per cent., skin diseases 6·1 per cent.

Penang.—Pupils examined in *English Girls' Schools* 1,481, of these 46·9 per cent. with gross dental defects, 10 per cent. with defects of throat, nose and ear. *English Boys' Schools*, pupils examined 4,786, with gross dental defects 55 per cent., nose, throat and ear defects

7 per cent. *Malay Vernacular Schools*, girls examined 1,677, with dental defects 65·9 per cent., nose, throat and ear defects 10 per cent. Boys examined 3,233, and of these 67·4 per cent. with dental defects, 9·8 per cent. nose, throat and ear defects, 7 per cent. with skin affections.

Province Wellesley.—English and Vernacular Schools, pupils examined 4,235, of these 35·8 per cent. showed dental defects, 11·7 per cent. skin affections, 7 per cent. nose, throat and ear defects. Hookworm and round worm infestations common in Malay schools in Penang and Province Wellesley.

Malacca.—English Girls' Schools, pupils examined 996, with carious teeth 51 per cent., with enlarged tonsils 21 per cent. *English Boys' Schools*, pupils examined 1,693, with carious teeth 57·3 per cent., with enlarged tonsils 6·6 per cent. *Malay Vernacular Schools, Boys*, examined 8,147, with carious teeth 11·5 per cent., enlarged tonsils 6·8 per cent., enlarged spleens 3·4 per cent. *Malay Vernacular Schools, Girls*, examined 325, with carious teeth 18·5 per cent., with enlarged tonsils 9·5 per cent., enlarged spleens 0·6 per cent.

Public Health, Sanitation, etc.—The general health of the people of the Colony is reported to have shown a definite improvement during the year under review; no case of dangerous infectious disease was reported, nor were there outbreaks of any infectious disease.

No important new developments nor major building schemes were undertaken owing to the necessity for economy, but plans and schemes were prepared for expansions along approved lines as soon as the financial position permits. The large increase in the garrison at Singapore is a matter of importance from the public health point of view. With one exception barracks are in the rural area and extensive *anti-malaria measures* have been undertaken in the interests of the health of the troops. Anti-malaria work is described in great detail in the Report under review and this section also contains a series of excellent photographic illustrations of special features of the work and methods adopted for dealing with the malaria problem.

Methods of *sewage disposal* and *refuse disposal* remain for all practical purposes as previously described (see this *Bulletin*, 1937, Supp., p. 167*). Though in the Singapore area 365 bore-hole latrines were constructed during 1936, it is said that a large part of the population still incline to follow easy and primitive means of disposal of excreta with consequent risk of water pollution, dangers from hookworm infection, etc. In Penang, 900 latrines were constructed or reconditioned, and 363 pit latrines and 368 deep bore-hole latrines provided. With regard to *water supplies* (see also this *Bulletin*, 1937, Supp., p. 167*), it is stated that in the Singapore area shallow earth-wells—liable at all times to pollution and sources of mosquito breeding—still serve a large majority of the population. Considerable progress was made in extending the supply of Municipal water to the Rural Area where there were 58 standpipes and 127 hydrants in use at the end of the year. Further provision in this direction is to be made.

Arrangements made for the control of *foods and drinks* manufactured or exposed for sale were described in these pages a year ago. It is stated that though there were 32 dairies in the Singapore area, only two under European management were satisfactory. *Housing and Town Planning* matters continue to receive the attention of the responsible authorities. Sanitary Inspectors make house-to-house inspections, and it is stated considerable improvement has been

effected in recent years as a result of this practice. *Estates* are regularly visited by Officers of the Health Branch and recommendations for sanitary improvements submitted to owners and managers where necesary.

The Training of Sanitary Personnel was continued. Nine private and eight Government students attended the course at Singapore, 29 candidates sat for the examination of the Royal Sanitary Institute and 21 were successful. Weekly and monthly meetings are also held at area centres where problems are discussed with Health Officers and Sanitary Inspectors.

Measures taken to Spread Knowledge of Hygiene and Sanitation continued along the lines previously described (see this *Bulletin*, 1937, Supp., p. 167*).

Port Health Work.—Quarantine measures were declared against ships arriving from certain ports in Siam, India, and China. Among other details of work during the year the following facts are recorded :—

	Singapore	Penang
Ships examined	885	536
Infected ships	0	3
Crews examined	73,858	45,825
Passengers examined (includes Pilgrims and Chinese immigrants)	209,317	99,194
Rats trapped and bacteriologically examined	683	?
Rats plague-infected	0	?

To the Singapore Quarantine Station 4,637 passengers admitted, 3 deaths
„ Penang „ „ 23,281 „ „ 5 „

At the Airports of Singapore and Penang, which have been designated *Sanitary Aerodromes* as defined in the Sanitary Convention (Air Navigation), facilities for quarantine are being provided.

Hospitals, Dispensaries, etc.—At Government Hospitals in the Straits Settlements (see this *Bulletin*, 1937, Supp., p. 168*) the record of work concerned with in-patient cases (exclusive of cases in Leper Settlements) reads as follows :—

Hospitals in	Total Treated	Hospital Deaths	Out-patients
Singapore	39,242	3,998	37,427
Penang	21,310	1,574	39,425
Malacca	9,250	683	13,282
Labuan	200	7	1,249
Totals	70,002	6,262	91,383

[In another place it is stated 67,429 patients were admitted to Hospitals, 72,135 were treated, and that 6,425 died.]

The prevailing diseases among in-patients were *malaria, respiratory affections, intestinal ailments, helminthic* and *venereal diseases.*

In addition to *Out-patients* treated at Hospitals (see above) 91,632 out-patients were treated at *Dispensaries* and 82,659 at *Travelling Dispensaries* during the year under review. Out-patient figures do not include those relating to patients treated at Infant Welfare Centres, School Inspections, Special Clinics, etc.

The notes which follow briefly summarize the reported descriptions of the principal diseases treated at various centres during 1936.

The incidence of *malaria* as judged by recorded figures declined considerably, 9,502 cases being admitted to Government Hospitals and 9,749 cases were treated as compared with 13,432 admissions in the preceding year, and there were 283 deaths due to this cause. Deaths due to malaria in the Straits Settlements as a whole numbered 1,315 but there were also 3,562 deaths ascribed to *unspecified fevers*. Types of infection among the 9,749 in-patient cases dealt with included 4,410 *subtertian*, 2,702 *benign tertian* and 188 *quartan* while 210 were mixed infections and 1,770 were unclassified. Mention has been made in the section *Public Health* above of antimalaria work undertaken in the Colony. There was one non-fatal case of *blackwater fever*.

The Third International Course in Malariology in the Far East, organized by the League of Nations was held at the King Edward VII. College of Medicine, Singapore, in April, May and June, practical field studies being arranged for in Indo-China, Java, and Malaya. The course was attended by 18 graduates from nine countries.

Plague has not occurred in Malaya for many years. *Cholera* is now rare owing to the provision of good water supplies and the special measures taken at ports and frontiers to exclude the disease. There is little *smallpox* in Malaya ; small outbreaks occur from time to time but they are easily controlled (see this *Bulletin*, 1937, Supp., p. 168*). All children born and all immigrants are vaccinated ; during 1936 Government Health Department Officers performed 21,254 primary and 43,625 re-vaccinations. Of *tropical typhus* 33 cases and two deaths were reported and 5 cases of Japanese River Fever. [With regard to the latter the reader is referred to the researches of the Pathologist at the Institute for Medical Research, Kuala Lumpur, p. 465, *supra*.] There were 21 cases of *cerebrospinal meningitis* of which 19 proved fatal.

In the Hospital Returns it is seen that 58 patients were admitted suffering from *diphtheria* and 20 died, while 84 deaths were ascribed to this cause in the Colony as a whole. On the other hand cases notified in the City of Singapore alone numbered 176.

As regards *enteric fever* it is again pointed out that itinerant hawkers of foodstuffs are mainly responsible for the presence and spread of the disease. During the year 565 cases of *typhoid* and 14 of *paratyphoid fever* were dealt with as in-patients at Government Hospitals and 146 of these died. In the Colony as a whole 187 deaths were recorded and in Singapore alone 455 cases of the disease were notified. In-patients treated for *dysentery* at Government Hospitals totalled 865 and 197 deaths were recorded ; the classification of cases reads 277 amoebic, 507 bacillary, 9 were mixed infections and 72 were undefined. In the Colony as a whole 314 deaths were ascribed to dysentery, and there were in addition 1,417 deaths assigned to the title *diarrhoea and enteritis*.

Tuberculosis is said to be increasing slightly and that the great majority of the cases dealt with are of the *pulmonary* form of the disease. Deaths due to all forms of tuberculosis in the Colony numbered 2,362 of which 1,406 occurred in Singapore. Returns relating to Government Hospitals contain the following facts :—

Cases of tuberculosis (all forms) dealt with	3,252, deaths 1,108
Admissions during the year	2,876
Cases of pulmonary tuberculosis alone ...	2,932, deaths 984
Cases of pulmonary tuberculosis admitted	2,602

The measures taken to combat the disease were detailed in these pages a year ago. Facilities for medical and surgical treatment are provided at the General Hospitals where special tuberculosis wards are available. The difficulty of persuading the poorer class of patient to seek treatment in early stages of the disease is again emphasized (see this *Bulletin*, 1937, Supp., p. 169*). In-patients at Government Hospitals treated for *lobar pneumonia* and *broncho-pneumonia* numbered 1,724 (1,611 admissions) and 974 died. The death-rate from pneumonia amongst Asiatics who are vulnerable to the disease is characterized as "alarming." There were 1,409 in-patients treated for *bronchitis* with 22 deaths.

Leprosy.—The increase in the number of cases seeking admission to leper settlements is a matter of grave concern to the Government and steps are being taken to deal with the problem. At present compulsory segregation of lepers is imposed by law, but as it is generally believed that drastic legislation has the effect of driving lepers into hiding, it is proposed to amend existing laws. Examination of immigrants at ports of entry makes it clear that the majority of the cases of the disease are introduced from outside Malaya. The Chinese immigrants are mainly responsible, for owing to the long incubation period infected persons may show no signs of the disease on arrival. Efforts are now being made to detect early signs of leprosy in Chinese and other immigrants (see also this *Bulletin*, 1937, Supp., p. 169*). Intensive treatment on modern lines was continued throughout the year at the Leper Settlements; the Reports of these Institutions describe the year's work in great detail, and from them the following facts have been extracted :—

Item	Leper Settlements	
	Pulau Jerejak, Penang	Leper Settlement, Singapore
Admitted during 1936	421	237
Total treated	1,447	508
Discharged	22	10
Absconded	?	27
Died	190	13
Remaining at the end of 1936	1,217	224

Of the 1,217 patients at Pulau Jerejak, 980 were Chinese, 187 Indians and only 37 were Malays. At this Settlement during the year Camp E. providing 37 double huts, with all necessary additions as regards sanitary conveniences, water supplies, etc., was practically completed, while Camp F. was occupied in October and 174 cases transferred there.

Venereal Diseases.—There are V.D. Clinics for males in Singapore, Penang, and Malacca, special sessions are held for women at the Women's and Children's Dispensaries in Singapore and Penang, and in addition facilities for treatment are provided at all hospitals and outdoor dispensaries. New cases presenting themselves for treatment at Government Clinics totalled 22,680 and of these 11,652 were Chinese, 6,794 Indians, 2,873 Malays, 576 Europeans, and 785 were grouped under the title of "Others." At Government Hospitals the following in-patient cases were dealt with :—

	Syphilis	Gonorrhoea	Soft Chancre	Tropical Bubo	Other V.D.
Admitted ...	1,267	665	276	128	221
Total treated	1,391	702	296	135	237

Only 19 in-patient cases of *yaws* are mentioned but out-patients treated for this disease numbered 5,711.

A well equipped clinic is maintained for the treatment of seamen. During the year 1,064 cases were dealt with of which 552 were Chinese and 399 European seamen.

Among *other diseases* discussed in the Report under review the following have been selected for mention. The incidence of *beriberi* during the past few years has been closely related to the level of general prosperity—during times of economic stress the enforced consumption of home-grown rice displaces the highly polished rice with resulting benefit to health. During the year 1,625 in-patients were treated (1,513 admissions) at Government Hospitals with 377 deaths. There were 567 admissions for *cancer* with 194 deaths, 1,940 cases of *chronic ulcers* and 345 admissions recorded as due to *anaemia*. Motor vehicles were responsible for 712 cases (with 47 deaths) out of 3,758 admitted for affections produced by external causes.

King Edward VII College of Medicine, Singapore.—At the commencement of the academic year in June 1936 with an entry of 20 medical and 16 dental students, there were 211 students on the roll of the College ; in December of the same year there were 187 students, of which 117 were medical, 62 dental and 8 pharmacy students. During the year 161 candidates sat for various professional examinations, 81 passed, 14 obtained exemption and 66 failed ; among the successful candidates 7 medical, 3 dental and 9 pharmacy students completed their course and qualified. (The first qualifying examination for the Diploma in Pharmacy was held in August 1936, see this *Bulletin*, 1937, Supp., p. 170*).

Valuable *research work* was continued in various Departments of the College. On the recommendation of the Council of the College, Government agreed that the nutritional researches undertaken by Professor J. L. Rosedale and his staff should be continued (see this *Bulletin*, 1937, Supp., p. 170*) with financial assistance granted by the Colonial Development Fund. An investigation undertaken to test the value of the histidine treatment of gastric ulcers, controlled by Professor R. B. Hawes of the Department of Medicine, found that the drug had no curative effects on such ulcers. Professor B. A. R. Gater of the Department of Biology continued his studies of Malayan anophelines ; other work included investigations on Malayan parasitic worms, and species of flies frequenting faecal matter. Professor E. K. Tratman carried out a number of investigations concerned with dental conditions. Scientific publications by members of the Staff included :—

Gater (B. A. R.). Revised edition of "Notes on Microscopy and Entomology." (Published for the convenience of graduates attending the International Course in Malariology.)

Tratman (E. K.). Notes on some Human Teeth from a Neolithic Cave in Malta.—*Proceedings University of Bristol Spelaeological Society*. 1935. Vol. 4. No. 3. pp. 233–249.

Tratman (E. K.). Note on the dental conditions of entrants to King Edward VII College of Medicine, Singapore.—*Malayan Medical Journal.* 1935. Vol. 10. No. 1. p. 16.
——. A case of dental caries in an unerupted lower third molar.—*British Dental Journal.* 1936. Vol. 61. p. 166.
——. Adamantinomas or multilocular cysts of the jaws.—*Ibid.* 1935. Vol. 59. pp. 417–436.
Scharff (J. W.) Anti-malarial drainage from the point of view of the Health Officer.—*Malayan Medical Journal.* 1936. Vol. 11. No. 1. p. 40.
——. Filling tree holes; an anti-mosquito measure.—*Ibid.* p. 58.
——. Anti-malarial drainage from the point of view of the Health Officer.—*Ibid.* No. 2. p. 67.

Scientific.—The summary of work carried out at laboratories in Singapore, Penang, and Malacca includes the following items :—

	Singapore	Penang	Malacca	Total
Serological tests for syphilis ...	10,340	8,361	4,454	23,155
Microscopic examination of bloods, pus, etc.	68	2,537	15,147	17,752
Cultural examination of bloods, etc.	4,661	1,464	464	5,589
Blood agglutination tests ...	2,731	215	403	3,349

Among 1,364 samples of blood serum examined for the presence of the specific agglutinins of the enteric bacilli, 212 were positive to *Bact. typhosum.* An investigation into the " H " and " O " agglutination, and " clot culture " in enteric infections was carried out, but owing to pressure of routine work analysis and publication of findings were not possible. The serum of a European patient agglutinated positively with *Br. melitensis* and *Br. abortus* ; cases of this infection are rarely met with in Malaya. A marked increase in the numbers of faecal specimens received is mentioned; almost similar findings as in previous years were recorded with 263 Flexner strains, 26 of the non-mannite Flexner group, 39 Shiga, and 24 Sonne bacillus.

Scientific publications included :—

Subrahmanyam (C.). Tropical Typhus in Singapore.—*Transactions, Royal Society of Tropical Medicine and Hygiene.* 1936. July. Vol. 30. No. 2. pp. 263–268.
——. Influenzal meningitis in Infants.—*Malayan Medical Journal.* 1936. Sept. Vol. 11. No. 3.

Financial.—Total expenditure on Medical and Health Services during 1937 amounted to $3,479,345, distributed as to Singapore $2,119,217, Penang $956,989, Malacca $376,036, and Labuan $27,103. Sums expended by the Public Works Department on the upkeep of buildings, etc., are not included in these figures.

P. Granville Edge.

REVIEWS AND NOTICES.

BECK (Conrad) [C.B.E.]. **The Microscope : Theory and Practice.**—264 pp. With 217 figs. 1938. London : R. & J. Beck, Ltd., 69 Mortimer Street, W.1. [7*s.* 6*d.*] [Review appears also in *Bulletin of Hygiene.*]

This is a book which all who use the microscope, whether for research or recreation, may read with profit. Mr. Conrad Beck has long been recognized as one of our leading authorities on microscope design and microscopic optics, and his wide knowledge and practical experience have enabled him to present in concise and lucid language an explanation of those technical problems which all who use the microscope must be prepared to face and overcome, if they wish to obtain accurate results. As a matter of fact, there exists a great need for such a book as this among both students and research workers, for it is a deplorable fact that in most training centres for medical and biological students little time or attention is given to teaching the correct use of the microscope, although every effort is made that the student should obtain a thorough knowledge of the technique of the fixation of tissues and their subsequent sectioning, staining and mounting. But of what use is the most perfectly prepared specimen if the student, or research worker, has not a sound knowledge of the proper optical adjustments of his microscope by which alone he can hope to arrive at a correct interpretation of the object he is examining ?

The technique employed in the correct use of the microscope is not entirely simple, and to neglect the principles involved may easily produce the most misleading results. In writing this book Mr. Conrad Beck has kept strictly before him the needs of the practical worker, and has devoted the bulk of the space at his command to a straightforward explanation of the theory and use of the microscope, without any reference to those complicated mathematical details which are solely of interest to the computor of microscopic lenses. The practical worker will be well advised to concentrate his attention on chapters I, III, V and VI, for these contain much valuable information, well illustrated, and free from all unnecessary technical jargon. The opening chapter is devoted to a simple description of the instrument and of certain characteristics of the mechanical and optical parts ; attention being drawn to the importance of the correct centration of illuminant, mirror, and substage condenser, correct tube-length, the aperture of the objective in relation to resolution and magnification, and the effect of thickness of cover-glass when high-power dry objectives have to be used. Many points briefly surveyed in this chapter are dealt with more elaborately in subsequent pages of the book ; thus chapter III is devoted to a detailed explanation of aperture and resolution, while chapter V deals with illumination and its technique, stressing the importance of avoidance of definition-destroying glare—an all too common fault—and passing on to the selection of substage condensers, their centring and proper adjustment, and the correct use of high-power dark-ground illuminators. The sixth chapter, devoted to microscopes of special design, contains a most interesting account of ultra-violet illumination and the ultra-violet microscope with which lenses made from fused quartz have to be employed. For many years it was realized that ultra-violet light, if it could be properly employed, would greatly increase the power of the microscope for revealing fine detail,

but although many experiments were tried out, it was not until Mr. J. E. Barnard, F.R.S., worked out a completely new technique that ultimate success was obtained.

The remaining chapters are equally important for reference, and deal with the geometric optics of the microscope; the photometry of the instrument; the testing of microscope objectives, and the use of polarized light as applied to the microscope. Many useful tables giving working distance of objectives, numerical apertures, magnifications with given objectives and eyepieces, etc., are included and there are a very large number of illustrations of microscopes and apparatus.

F. Martin Duncan.

Beckman (Harry) [M.D., Professor of Pharmacology at Marquette University, School of Medicine, Milwaukee, Wis.]. **Treatment in General Practice.** 3rd Edition Revised and Entirely Reset.—787 pp. With 7 figs. & 1 chart. 1938. Philadelphia & London: W. B. Saunders Company. [42*s*.]

In this book a brief general description is followed by an exhaustive discussion of the relevant and appropriate therapeutic measures in respect of each of the principal diseases of man, with few exceptions—exceptions, however, which are of some importance to tropical workers since they include Asiatic cholera, trypanosomiasis, leprosy, plague and yellow fever.

The various methods of treatment have been culled from the experience of physicians all over the world and the book contains a good bibliography which enables the reader to follow up to its source any measure of special interest or appeal. The author modestly states that he regards himself merely as an editor and that the true authors are the men and women whose names appear in the bibliography. Unfortunately, this method by its generosity and very scope leads in parts to weakness: by including all opinions, lines of therapy are indicated which in certain cases rest upon very insecure foundations while in some parts methods are described which are no longer commonly used. On occasion the author's iconoclasm does break through his charity in a charming manner, but one would have wished that with his wide experience he had permitted himself to have been more frequently and even more ruthlessly critical. However, the author has assembled a vast amount of therapeutic data and has provided a useful and accessible source of knowledge and interest for all who are engaged in the treatment of disease.

F. Murgatroyd.

Festschrift Bernhard Nocht zum 80. Geburtstag (4 November 1937) von seinen Freunden und Schülern.—pp. x + 704. Ill. 1937. Hamburg: Kommissionsverlag Friederichsen de Gruyter & Co.

Bernhard Nocht is to German what Patrick Manson was to British tropical medicine. He was born in 1857 at Landshut in Silesia and educated in the Realgymnasium there. After graduating in medicine at Berlin in 1881 he joined the Army and later the Navy. In the latter service he gained his first practical experience of tropical diseases during voyages to the Mediterranean and the East. He

himself contracted malaria, a disease from which he suffered for several years and which has remained one of his chief interests ever since. His scientific work began in 1887, when he was seconded to the Hygienisches Institut in Berlin, at that time under the direction of Robert Koch. The turning-point of his life came in 1892 during the cholera epidemic in Hamburg. He was sent to take charge of measures for its control in the port, and so successful were his efforts that the Hamburg Senate offered him the newly created post of Port Medical Officer. He resigned his commission in the Navy in order to accept this appointment and it was then that his real life-work began. Not only did he develop the health services of the port from very meagre beginnings to a high degree of efficiency, but also in 1900, following the examples of Liverpool and London in the preceding year, he established the now famous Institut für Schiffs- und Tropenkrankheiten and became its first Director. Its success exceeded all expectations, as the yearly increasing numbers of German and foreign students testified. On being entrusted in 1906 with the control of the whole medical service of Hamburg, Nocht was obliged to hand over his port work to a successor, but retained his directorship of the Tropical Institute, to which 14 years later, on retiring from the public service, he was able to devote his undivided attention for a further ten years. Even then his activities did not cease, for at the age of 73 he went on a world tour to study leprosy in India, Malaya, Siam, Manila and Brazil. Among his numerous scientific writings perhaps the most important are those on malaria and on beriberi. Nocht's great services to tropical medicine received well-merited acknowledgment in 1925 on the occasion of the silver jubilee of the Institute he founded, and in 1927 his seventieth birthday was marked by the publication of a volume of works on tropical diseases to which 89 of his friends and pupils contributed. It must be no small comfort and gratification to him to know that he is still not forgotten in his retirement, a tangible proof of which is this second Festschrift in which 116 contributors from 30 different countries have joined to honour him on his eightieth birthday. *C. C. Barnard.*

Crozafon (Charles). **L'arséno-résistance des trypanosomoses humaines.** [Arsenic Resistance of the Human Trypanosomes.] [Thesis for Doctorate of Medicine, Univ. of Bordeaux.]—143 pp. [Bibliography.] 1936. Bordeaux: Imprimerie-Librairie Delmas, 6 Place Saint-Christoly.

In this thesis the author gives an excellent summary of recent work on the important subject of arsenic-resistance. The article is divided into two sections, the first dealing with the experimental investigations which have been conducted during the last 10 or 12 years on the nature and mechanism of the phenomenon, and the second with clinical observations; there is an extensive list of references. The work is well worth reading by those who are interested in the subject and have not themselves had the opportunity of reading the voluminous literature from which it is compiled. *W. Yorke.*

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